Tailoring and Critical Thinking—
Key Principles for Acquisition Success

CONTENTS

DoD Use of Commercial Acquisition Practices
—When They Apply and When They Do Not

Frank Kendall

The Department of Defense (DoD) generally buys major weapon systems through the defense acquisition system, a process that is highly tailorable but still built around the assumption that the DoD will compensate suppliers for product development, contract through Defense Federal Acquisition Regulations and be heavily involved in all aspects of the product life cycle. A number of organizations—including the Defense Business Board, some think tanks and some in Congress—have encouraged or recommended greater use of commercial practices. There are indeed times when using more commercial practices makes sense, and we should be alert to those opportunities—in any aspect of defense procurement.

There are three aspects of "going commercial" that I would like to address—first, purchases based on the fact that an item is offered as a commercial product; next, the need to access cutting-edge commercial technologies; and, finally, those cases where we can take advantage of private investments to develop products we might traditionally have purchased through the normal multi-milestone acquisition system.

Our policies and regulations try to strike the right balance between taking the steps needed to protect the taxpayer from overpaying while simultaneously avoiding discouraging commercial firms from doing business with DoD by asking for more information than they are willing to provide. For purely commercial items widely and competitively sold on the open market, this is easy. For thousands of items, from office furniture to cleaning supplies to laptop computers, the DoD pays commercial prices (subject to negotiated adjustments for quantity-based discounts, etc.) without inquiring as to the costs to produce the products. Other items are more clearly and purely military products, such as a replacement part for a howitzer or a low observable fighter component. The gray area between these extremes represents a problem in first determining that a product can be considered commercial, and, then, if there is no compe-

tition for setting the price for that product, obtaining adequate information from the supplier and other sources to determine that the price charged is fair and reasonable. We are working to expedite these processes, make them more predictable, and provide technical support to the procuring officials who must make these difficult determinations. I'm afraid that we will never be perfect at this, given the vast number of items the DoD procures and our limited resources, but we must and will improve our performance while preserving a reasonable balance.

It is clear that in many areas of technology the commercial market place is moving faster than the normal acquisition timeline for complex weapon systems. Examples include information technology, micro-electronics, some sensor technologies, some radio frequency devices and some software products. In most cases, these technologies will enter our weapon systems through one of our more traditional prime contractors. Our prime contractors and even second- and lower-tier suppliers are looking for a competitive advantage, and, when commercial technologies can provide that advantage, they will embed them in their products.

Competition among primes can give us access to current commercial technologies early in a program, but we often move to a sole-source situation when we down-select for Engineering and Manufacturing Development (EMD), reducing the incentives for inserting state-of-the-art commercial technologies. We can sustain these incentives by insisting on modular designs and open systems, both emphasized under the Better Buying Power initiatives. As part of this process, we also must manage intellectual property so we don't experience "vendor lock" in which we cannot compete upgrades without going through the original contractor.

Assistant Secretary of the Air Force (Acquisition) Bill LaPlante's initiative to "own the technical baseline" includes the concept of proactive management of configuration control and of interfaces so that the DoD preserves the option to introduce technology at rates more consistent with the pace of relevant commercial technology improvements.

The DoD also is taking other steps to improve our access to commercial technology. These include opening the Defense Innovation Unit–Experimental (DIU-X), in Silicon Valley, investments through In-Q-Tel and increased emphasis on the productivity of programs like the Small Business Innovative Research program. The DoD also is evaluating the congressionally sponsored Rapid Innovation Fund (RIF) and will make a decision this year as to whether to include a request for funds for a Reduction in Force in the Fiscal Year 2017 President's Budget. All these steps are designed to open the DoD to more timely and broad commercial technology insertion.

The last of the three "going commercial" topics I would like to cover involves situations in which the DoD substitutes a more commercial acquisition model for the ones depicted and described in DoD Instruction (DoDI) 5000.02. In some cases, industry, traditional defense contractors and others will invest to bring a product to the DoD market, without DoD shouldering the direct cost of product development. The critical motivation for these independent businesses decisions is the prospect of reasonable returns on the corporate investment.

Cost Sharing

Sometimes, especially when there is a mixed DoD and commercial market for the product, a cost-sharing arrangement may be appropriate in a public private "partnership" for development. DoD acquisition professionals need to be alert to these opportunities and prepared to analyze them and act on them where they benefit the government. When we do this, we may need to be innovative and think "outside the box" about business arrangements and contract structures. In these cases, the structure and processes in DoDI 5000.02 may be highly tailored or even abandoned. I'll illustrate this concept with a few real-life examples.

As we moved down the path of DoD-funded research and development for tactical radios under the Joint Tactical Radio Systems program, we discovered that in parallel with the DoD-funded programs of record, some companies had invested their own money to develop and test products that used more advanced technologies than the Programs of Record. These essentially commercial product development efforts offered the prospect of cheaper and higher performance systems, without a DoD-funded development program. As a result of this, we changed the acquisition strategy to allow open competitions and stressed "best value" source selections so we could take advantage of the most cost-effective radios available.

Our "system" had a little trouble adjusting its planning to this type of acquisition. The Developmental Testing people wanted to perform a standard series of developmental tests, even though the development was complete. Operational Test people wanted to test each competitor—before source selection. Program oversight people wanted to do Milestone (MS) A and B certifications, even though there was no reason to have an MS A or B.
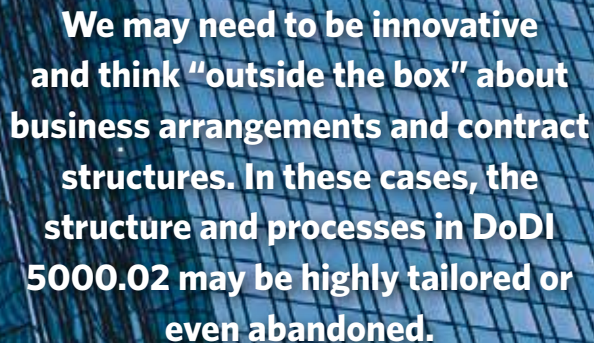
What we needed, and where we ended up, was a competitive source-selection process for production assets that included an assessment of bidder-provided test data, laboratory qualification testing, and structured comparative field testing to verify the offered products met DoD requirements. There were minimum requirements that had to be met; once that was established, a bidder would be in a "best value" evaluation for source selection for production. It was a little surprising to me

how wedded our workforce, in both the Service and the Office of the Secretary of Defense, was to the standard way of doing business—even when it didn't really apply to the situation.

The next example involves space launch. The DoD is working to bring competition into this market. That opportunity exists because multiple firms have been investing development funds in space launch capabilities for both commercial and DoD customers. We acquire space launch as a service; there is no compelling reason for DoD to own launch systems. What we need is highly reliable assured access to space for national security payloads, which can be acquired as a service. For some time, we have been working to certify a commercial launch company to provide national security launches. That milestone recently was achieved for the first "new entrant" into national security launches in many years. The DoD did not fund the development of the new entrant's launch system, but it did provide support through a Cooperative Research and Development Agreement for the certification process.

More recently, the need to remove our space launch dependency on imported Russian rocket engines has caused the DoD to evaluate options for acquiring a new source of reliable competitive launch services. Through market research, we know there are options for private investment in new launch capabilities but that industry's willingness to develop the needed products may depend on some level of DoD funding. The DoD intends to ask for industry bids in a very openended framework for whatever financial contribution would be necessary to "close the business case" on the guaranteed provision of future space launch services. This novel acquisition approach will work only if the combined commercial, other government customer, and military launch demand function can provide enough anticipated launch opportunities to justify industry investment. This effort is a work in progress, and we don't know if it will prove successful. If it does succeed, it will provide for the continuing viability of two competitive sources of space launch services—without the need for DoD funding and executing a new standard DoD development program for a launch or propulsion system.

Another example from the space area is the Mobile Ground User Equipment (MGUE) for GPS III. These GPS receiver electronics "chips" will be ubiquitous in DoD equipment and munitions. The technology also will be relevant to commercial GPS receivers that will be embedded in millions of commercial devices. Here, also, the DoD has been proceeding with a standard DoD-funded development program with multiple vendors developing MGUE risk reduction prototypes leading up to an EMD program phase. The combined market for this capability is so great that the competitors proceeded with EMD on their own, without waiting for a DoD MS B or contract award. They

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did this so successfully that the EMD phase of the program was canceled in favor of a commercial approach that limits the DoD's activities to compliance testing of the MGUE devices and integration of those devices into pilot platform programs.

The final example I'll cite is the Marine Corps decision to defer the program to acquire a new design amphibious assault vehicle in favor of a near-term option to acquire a modified nondevelopmental item (NDI). The Marine Corps concluded, I believe correctly, that the technology was not mature enough to support the Corps' desired performance levels and that a new product would be unaffordable. As a result, the Marine Corps opted to first evaluate and then pursue a competitively selected near-NDI alternative. This is more military than commercial off-the-shelf, but the principle remains the same. This program does include some modest DoD-funded development to, for example, integrate U.S. communications equipment and test for compliance with requirements, but it is a highly tailored program designed to move to production as quickly as possible and with minimal DoD costs.

The Common Thread

What all these examples have in common is the DoD's recognition that an alternative path—outside the normal DoDI 5000.02 route—was available and made sense from both a business and an operational perspective. Once such an opportunity is recognized, a more commercial approach can be adopted, but this requires some novel thinking and openmindedness on the part of the DoD acquisition team. We cannot "go commercial" for all of our acquisitions or even most of our weapons systems. The normal process works best for the standard low-volume, highly specialized, cuttingedge and uniquely military products that populate the DoD inventory. The business case simply isn't there for industry to develop and offer these types of products without DoD development funding. In all standard DoD acquisitions, however, we need to proactively look for ways to embed or insert the most current commercial technologies. Where commercial approaches are justified, we need to spot and capitalize on the opportunity.

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4

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Tailoring and Critical Thinking—
Key Principles for Acquisition Success

Mike Kotzian, D.M. ■ *Michael Paul* ■ *Jesse Stewart*

Based on recent Department of Defense (DoD) acquisition guidance, programs now have the opportunity to approach acquisition program management in ways previously viewed as nontraditional. Unfortunately, many programs are hesitant to veer too far from accepted routines, thereby not taking advantage of opportunities to explore new acquisition approaches. In one partnership between the Defense Advanced Research Projects Agency (DARPA) and U.S. Navy, however, such opportunities have been fully embraced and may provide future programs with touchstones on how to increase program cost-effectiveness and efficiency as well as program success.

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The Long Range Anti-Ship Missile Opportunity

To ensure DARPA maintains its ability to deliver outsized impact by focusing on breakthrough technologies, the agency seeks active engagement with its technical community and users as sources of inspiration. One approach DARPA uses to better understand warfighter needs is to visit Service and Combatant Command organizations and listen to customer desires that require innovative solutions in a short time period. In 2008, one such visit with ADM Robert Willard (Commander, U.S. Pacific Fleet) resulted in a request for a technical capability that became the Long Range Anti-Ship Missile (LRASM) program.

The LRASM program started in 2009 as a joint design and demonstration initiative between DARPA and the Office of Naval Research. With DARPA as the lead organization, the LRASM program was to leverage the state-of-the-art Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) airframe, and incorporate additional sensors and systems to achieve a survivable subsonic cruise missile (See artist's concept on Page 8).

In 2013, DARPA conducted two successful flight demonstrations that initially proved the technical approach. Concurrent with these technical accomplishments came two important programmatic decisions. First, a Resource Management Decision was issued that officially provided resources for a joint DARPA-Service transition effort to mature the technology and deliver an early operational capability (EOC) by Fiscal Year (FY) 2018. Second, an Acquisition Decision Memorandum (ADM) was signed by Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]) Frank Kendall in February 2014 that approved the Navy's request to implement an accelerated acquisition approach with streamlined guidance and delegated the Milestone Decision Authority to Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition (ASN/RDA).

This effort was one of many to come upon the transitional "Valley of Death"—an effort moving from technology demonstration/maturation to formal Program of Record status—resulting in programs encountering both challenges and opportunities depending on the chosen acquisition philosophy. According to CAPT Carl Chebi, the U.S. Naval Air Systems Command (NAVAIR)'s Precision Strike Weapons program manager (PMA-201) in 2009–2013, the early recognition of the high risk yet high potential of this effort by senior leadership helped set the foundation for a successful transition.

Establishing the Foundation

A key outcome from the ADM was establishment of the LRASM Deployment Office (LDO), which was given the responsibility to implement the accelerated acquisition approach with the streamlined governance. At this point, the LRASM program began an LDO restructure based on the need to continue technical development while transitioning from DARPA to the U.S. Navy.

The subsequent LDO restructuring discussions were influenced largely along cultural tendencies—that is, merging people with different perspectives on managing a weapon system acquisition program. On one hand there was the DARPA worldview: Modify and tailor guidelines to achieve outsized impact as quickly as possible, which leads to acceptance of some high-risk options. Alternatively, there was NAVAIR's worldview: Adhere to a rigorous and methodical approach in close alignment with existing Office of the Secretary of Defense (OSD) and Navy guidance and oversight.

Realizing that a traditional acquisition program approach was impractical with an FY 2018 deployment timeline, the cooperatively led DARPA/Navy LDO was a very close teaming arrangement with co-leads: Dr. Arthur Mabbett from DARPA's Tactical Technology Office and Navy CAPT Jaime Engdahl, PMA-201 program manager from the Program Executive Office for Unmanned Aviation and Strike Weapons (PEO [U&W]).

When establishing the LDO, Mabbett described two LDO characteristics thought necessary to meet the LRASM program goals: "The LDO required an approach ensuring focused and dedicated collaboration between the S&T [Science and Technology], Acquisition, and T&E [Test and Evaluation] communities. Also, the organization needed to be given a high degree of autonomy while unhampered from the normal acquisition program bureaucracy. Therefore, we wanted the LDO to incorporate a principled program execution approach: Time is of the essence, flatter/leaner organization, decision timing aligns with program execution, and streamlined processes."

Artist's concept of the LRASM in action.
With permission from Lockheed Martin.

Key Principles for Success

To achieve a successful transition resulting in a warfighter capability by FY 2018, the LRASM team relied upon two powerful acquisition principles—tailoring and critical thinking.

Tailoring

The new DoD Instruction (DoDI) 5000.02 (*Operation of the Defense Acquisition System*) dated Jan. 7, 2015, includes more than 50 references to the principle of "tailoring." As stated in the Instruction: "The structure of a DoD acquisition program and the procedures used should be tailored as much as possible to the characteristics of the product being acquired, and to the totality of circumstances associated with the program including operational urgency and risk factors."

This concept is illustrated by the four basic and two hybrid defense acquisition program models presented in DoDI 5000.02. These models are intended to serve as examples of program structures tailored to the type of product being acquired or the need for accelerated acquisition. The explicitly stated expectation for every acquisition program is to view the most relevant model (i.e., hardware focused, software focused, etc.) as an initial baseline approach, which then should be tailored to the unique character of the product being acquired. In the DoDI 5000.02 cover memorandum, Kendall stressed the importance of program managers using these models "... as

references to assist their thought processes and analysis of the best structure to use on a given program."

In the case of the LRASM program, the LDO was structured when the new DoDI 5000.02 was released. This timing turned out to be fortuitous. Navy CAPT Kevin Quarderer, LRASM principal deputy program manager during the technology demonstration effort, remarked: "The LDO team viewed the new DoDI 5000.02 to be more permissive than previous versions. We felt this new guidance provided justification—and formally sanctioned backing—for the team to do what they felt necessary to meet the LRASM program time lines. We recognized that we were now in a position where we could tailor our program to only accomplish the absolutely essential statutory, regulatory and milestone requirements while, at the same time, negotiating out from other processes, reviews, documents, etc., that did not provide any 'value-added' contribution."

Since the LRASM program was acknowledged as an accelerated acquisition program, the LDO team embraced the tailoring concept afforded by Model 4 (Accelerated Acquisition Program) as its acquisition framework starting point (Figure 1).

Engdahl described the LRASM team's challenge of taking this new accelerated acquisition construct that was very flexible

Figure 1. Model 4: Accelerated Acquisition Program
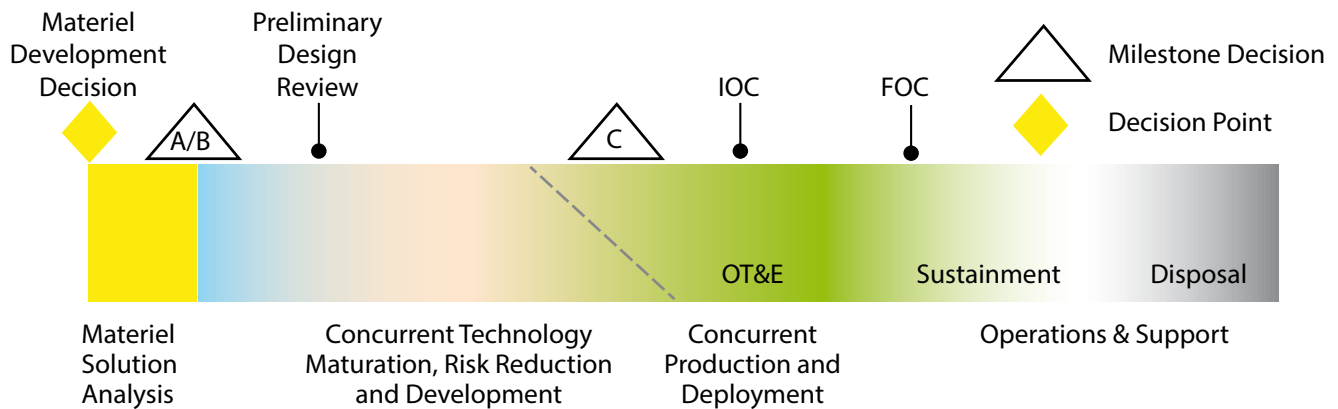
Source: DoDI 5000.02, Jan. 7, 2015, p. 13.

and tailorable: "The team wrote a 'clean-sheet' acquisition strategy that tailored the systems engineering process and milestones that we defined as 'knowledge points' to clearly articulate the points in the program where we expected to have enough knowledge to make specific program decisions. We then tailored documentation and requirements strategies to move as quickly as possible through the program."

Critical Thinking

A basic principle for improved defense acquisition outcomes is to expect program managers and their team to think critically. Kendall has highlighted critical thinking as a cornerstone to improved acquisition outcomes. As one of the four key overarching principles associated with the Better Buying Power initiative, he wrote: "The first responsibility of the acquisition workforce is to think. … Our workforce should be encouraged by leaders to think and not to automatically default to a perceived 'school solution' just because it is expected to be approved more easily."

The LRASM program was based on the understanding that critical thinking was necessary for program success; the program could not afford to blindly follow well-worn paths used by other programs. The program management team needed to think in terms of being trailblazers in challenging the norm—and critical thinking was a skill that would help the team do so. Fortunately, with the influence of DARPA's long-established culture that seeks out critical thinking, this skill became part of the LRASM "way of life" from the beginning.

Mabbett identified the principle of critical thinking as one of the keys to success for not just the LRASM program but for any acquisition program: "Always challenge the norm or typical way of doing business. Yes, programs have guidelines and processes to consider; but programs should not take these guidelines and processes as things that have to be followed unquestioned. Add logic and thought. Think about what processes exist to help—as program manager, IPT [Integrated Product Team] lead, or team member—to make the right

decisions. Processes are simply one piece of a program's tool set. Learn to challenge and question assumptions and data presented until you're convinced the most cost-effective and efficient decision is being made."

According to Mabbett, "Team empowerment was absolutely essential to the daily progress and success of the program. We did not treat 'empowerment' as a cliché. Rather, leadership challenged the team to make decisions and solve problems using a critical thinking approach. Our job as leadership was, in turn, to engage the team members on their decisions to verify they had thought the problem and solution through. We had a mutual exchange to confirm the thought process and decision, and then moved on."
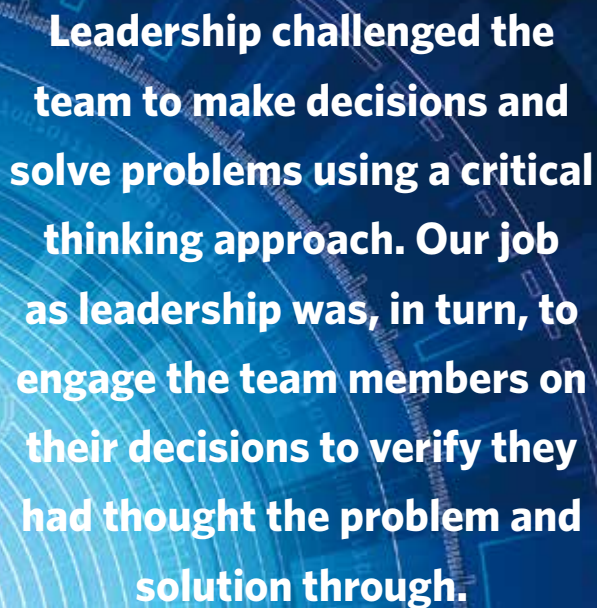
Critical thinking is a key part of all LRASM processes. As one example, the program tailors its system engineering process to the specific systems engineering event. The large number of technical experts who typically show up at such events is drastically reduced to ensure a focus on the technical review boards, where approximately a half-dozen independent participants come in to provide experienced consultation. So systems engineering events such as Preliminary Design Reviews and Critical Design Reviews become important learning events about where technical risks may lie. This approach relies upon a more critical-thinking approach and provides a more useful outcome for the team.

Key Success Enablers

LRASM then used these two key principles—tailoring and critical thinking—in conjunction with interrelated key success enablers in order to best structure the program for a successful acquisition outcome.

Senior Leadership Access

LRASM benefited from senior leadership access based on direct support to a Combatant Commander and Numbered Fleet Commander in order to counter adversaries' use of emerging technologies. The LRASM program used this access to

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coordinate senior leadership support for the tailoring and critical thinking approaches being developed; this established a solid program foundation at the very beginning.

With this foundation, the LRASM program lean governance approach then included the establishment of an Executive Steering Board (ESB) with Stackley and DARPA Deputy Director Steve Walker as the principals. Monthly ESB meetings became the core means for LRASM senior leadership to regularly and quickly inform stakeholders of ongoing progress and key decisions. The ESB approach was able to minimize staffing churn and perceived bureaucratic obstacles. The objective was to keep the program moving forward, and the ESB's streamlining of the oversight process turned out to be an effective means to accomplish this goal.

Stakeholder Buy-In
Constant communication was absolutely essential to educate stakeholders at all levels as to how the LRASM program was structured and managed. As this acquisition program differed from the norm, clear messaging and continuous engagement were of paramount importance. Expectations were communicated explicitly and unambiguously. The LRASM leadership team also took on an instructor role to educate those comfortable with the more traditional acquisition process: It was not only acceptable—but expected—to take more nontraditional approaches in an accelerated fashion.

Streamlined Decision Making
The LDO decision-making process was developed very early in the program: Decision making was considered fundamentally important to keep the LRASM program successfully moving forward. Not only did the DARPA/Navy interface have to be

managed, but the Air Force JASSM-ER and B-1 and Navy F/A 18 programs had extensive equities affecting daily program execution—and these also required attention.

The LRASM program employed as little formal staffing as possible. Weekly decision boards were scheduled to discuss program status. These meetings concentrated on decision criteria, or decisions that were needed in order to maintain program momentum. Team leads came prepared with background, options and recommendations for each of their decision criteria topics so LRASM leadership could make decisions. Such an approach created transparency and resulted in much discussion. As a result, there was no uncertainty about coming issues that could hold back the program if there was no decision.

"I insisted on a succinct decision-making process since we didn't have the time to continuously analyze every problem over and over," Mabbett stated. "The philosophy was for LRASM leadership to verify critical team decisions in order to maintain progress."

Risk Management
One of the LRASM program frameworks is reliance on a fundamental systems engineering process woven into the program's integrated master schedule (IMS). Once a week, the IMS is reviewed with the team leads and prime contractor, Lockheed Martin, to evaluate program status in terms of identified metrics inside the systems engineering process. Wrapped into this activity is an integrated risk process. As a result, all risk-mitigation steps are quantified as they relate to the systems engineering process and are rolled into the IMS. Therefore, the program managers can see how risk mitigation is executed inside the IMS and, in turn, actually reduce the formal risk associated with the program.

Careful consideration ensured that risk management was steeped in systems engineering principles—but not driven by the systems engineering process. This approach has become an important ESB tool from an oversight perspective—specifically, in terms of how risk can be used when focused within the context of the systems engineering process and IMS to mitigate risks as much as possible.

The Right People
LRASM leadership kept the initial LDO small with no more than 12 subject-matter experts—all of them unquestioned experts. These highly skilled team members were handpicked for openness, agility and motivation to lean forward and succeed. Subsequently, the LDO has incorporated Navy personnel as functional leads alongside DARPA subject-matter experts now that the transition effort is under way. But the tenet of the program has not waivered: Use only the right person with the right skills in the right job.

The importance of keeping to this fundamental tenet is borne out in the risk-management process. Having chosen the right people in the right place with the right skills, LRASM

leadership empowered the team members to come up with their own processes and products that they used to manage the program—in this case, the risk-management process. Such an approach helps create team buy-in and is an example of applying the necessary rigor and then using it for speed in the program.

Such empowerment of the right people allows the LRASM program to maintain a flat, lean organizational profile. LRASM leaders view this situation as a leadership opportunity in that their people are chartered not only to execute the program but to invent rapid and innovative processes and keep the program moving forward. In this regard, Quarderer remarked: "Management's main challenge was to keep up with each of our teams as they made progress, but that's fine—that's what management should want."

Inspired by the Mission
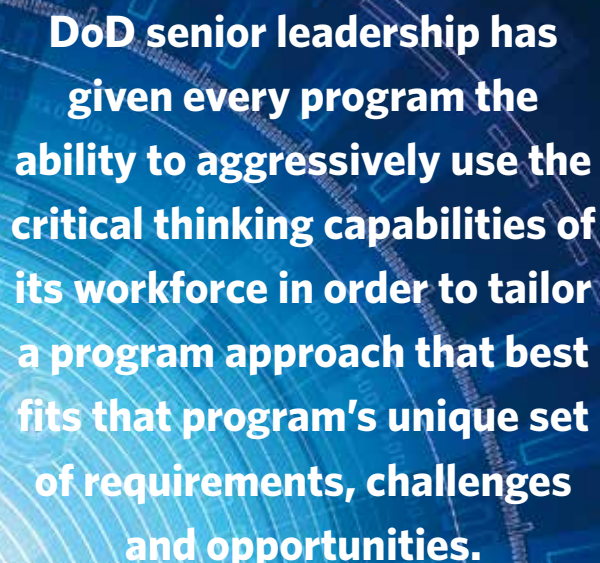
Quarderer explained that his time in the Fleet helped him to stay motivated and to motivate others while part of the LDO. "I remember feeling that I did not have the upper edge that I wanted, and that if we went to combat, I didn't feel that the end outcome was going to be where I wanted it to be," he said. In sharing his experience and the fact that ADM Harry B. Harris Jr., then commander, U. S. Pacific Fleet, had taken time to address the LDO about the importance of its efforts, Quarderer felt that the team members understood the sense of urgency in meeting their commitment.

Operational Pause

While the recognized sense of urgency was driving the team to move quickly, Engdahl and Mabbett recognized the need to take time to assess the effectiveness of the LDO. They approached the Defense Acquisition University to conduct interviews and a Team Effectiveness Survey to provide an assessment of the organization, individual satisfaction, team effectiveness, communications and command climate of the LDO. While it seemed the effort would take precious time away from the many things the LDO needed to do to make aggressive progress, the effort proved critical for the leadership team's ability to address the LRASM challenges and opportunities. Quarderer commented: "We needed to take a pause and figure out what was going well, what were long-term challenges, and what needed to be corrected. We needed to do all that very quickly before we got too far down the road in any of those nonstandard organizational pieces that were not working well before they festered too long. We needed the team to be a well-functioning group so that we could focus completely on the mission if we were going to make our timeline."

Maintain Focus

Like any acquisition program, the LRASM program was buffeted by a multitude of expectations that were not always in alignment with each other. From the very beginning, the LRASM leadership kept a singular laser focus on the stated and original requirements. Efforts to expand LRASM's capabilities through requirements creep were continually and

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successfully rebuffed. This message was strongly conveyed to the LRASM team to ensure a "one voice" approach to expectations management. The schedule was too tight for anything to be entertained but the originally stated requirements; anything different was recognized as a near-certain reason to miss the FY 2018 EOC date.

Not "The" Answer

Can the initiatives and approaches used by the LRASM program be replicated by all acquisition programs? No. A one-size fits all approach would not lead to the successes realized by the LDO. Can other acquisition programs examine LRASMs initiatives and approaches for potential applicability? Absolutely.

And that's the point: The LDO construct is not "the" answer for how to further improve government acquisition processes. But it illustrates that all programs have the opportunity to develop their own tailored initiatives and approaches. DoD senior leadership has given every program the ability to aggressively use the critical thinking capabilities of its workforce in order to tailor a program approach that best fits that program's unique set of requirements, challenges and opportunities.

All programs need to eagerly embrace such a mindset. Threats to our national security are accelerating while budgets decline, and therefore we all need to challenge existing processes and procedures so we can produce and deliver weapon systems in the most cost-effective and efficient manner possible. Anything less is a disservice to the warfighters and taxpayers. &

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Cost Capability Analysis

Introduction to a Technique

Frank Delsing

nder Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall and Secretary of the Air Force Deborah Lee James have introduced many new initiatives in an effort to improve U.S. Air Force Acquisition, including Better Buying Power, Owning the Baseline, Bending the Cost Curve, and others.

A common theme encountered in these initiatives, as mentioned by James in January 2015 is the "Cost Capability Analysis process." The goal of this process is to use the knowledge of capability trade-offs to determine where a small trade in capability (e.g., top speed of an aircraft) could be adjusted for large cost savings. So how would a program manager (PM) go about doing this?

While the concept is fairly straightforward (just tell me where I can save some money without losing too much capability), the actual process to find these trade-offs can be somewhat daunting. How does a PM know where capability trade-offs can be made within a set of user's requirements? Which trades provide the greatest value? How is an objective basis provided for requirement trade-offs?

Delsing is retired U.S. Air Force lieutenant colonel and was the T-X (trainer jet) deputy program manager and helped to develop the application of the Multi-Attribute Decision Model techniques to the acquisition process for Air Force Materiel Command. The author expresses special thanks to Retired Lt Col Len Cabrera for the example used in this article, as well as the United States Air Force Academy Capstone team for its computer-based tool.

Figure 1. Example of Requirements for Acquiring an Automobile

Stakeholder	Issues
CEO & Energy Office	Needs to be "Green," small carbon footprint
Resource Manager	Must be very safe Must be reliable
Junior Council	Needs to provide entertaining sound system
Safety Office Advisory	Needs all weather capability Needs to be as safe as possible
Recreation Committee	Storage capacity is essential Must be capable of mountainous driving
Financial Office	Must be affordable Must require minimal maintenance

Source: The author.

One method of answering these questions is the Multi-Attribute Decision Model (MADM). The MADM uses an attribute hierarchy to assign a value score to each alternative. Alternatives then are compared based on the requirement attribute score and cost to determine which are most efficient (i.e., provide greatest performance for the cost, or lowest cost for given performance). Once these efficient alternatives are identified, it's up to the PM, working with the stakeholders, to decide the proper trade-off between price and performance on the efficient alternatives.

The value score is computed using an attribute hierarchy. The first level breaks down the requirements by category, which is then weighted so that the percentages add up to 100 percent. Each requirement attribute within a category similarly is weighted within the category, again summing to 100 percent. Finally, specific performance metrics then are identified and assigned relative importance to achieving the requirement.

Put more simply, this method helps a PM and the stakeholders decide when more than one requirement drives the solution. What sounds complex actually is fairly straightforward. A car-buying analogy can demonstrate how it works.

Let's say that you, as a PM, have been tasked with acquiring an automobile for your organization. The first step already has been done: Your requirements have been handed to you (Figure 1).

Your boss sums up the task: Select the best overall car that balances performance, roominess, efficiency, safety and cost.

Based on these inputs, it is time to develop the requirement attributes you're going to evaluate. More specifically, you need to work with your stakeholders to develop those measurable attributes you will use to provide the capability requested. For example, both the Community Outreach Representative and the Safety Office Advisory have requested a safe vehicle. If we use that input to create a "Safety" category, we can then look at some common safety features that the user may want in a modern automobile. In

Figure 2. Category and Attribute Weightings Within the Categories
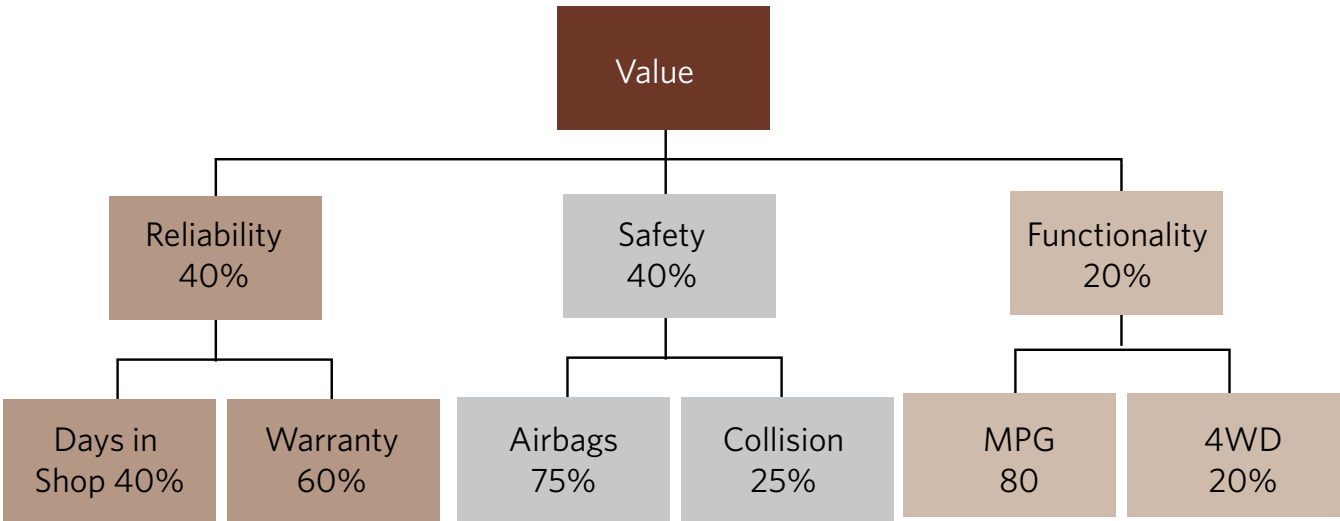
Source: The author.

this case, we'll use number of airbags and braking distance, given a speed of 60 miles per hour (mph).

Also note that some requirements may be eliminated at this stage for not really being as important as the stakeholders originally thought. In our example, it turns out storage capacity is not a high enough priority to call out specifically and therefore was eliminated early.

Once you have agreed to the requirement attributes, lead the stakeholder to prioritize the requirements. In this case, work out the relative value of each requirement category followed by each individual requirement attribute. Remember that the sum of the category weightings must equal 100 percent, and the sum of the attribute weightings within the categories must also equal 100 percent. (Figure 2).

Next, you need to determine where the stakeholders want the actual value of each of these requirements to be. It is helpful to "anchor" these curves with some questions. What value would be preferred (i.e., your target value)? What is the least acceptable value (i.e., any worse, and the requirement no longer provides any value)? What would be the ideal number (i.e., any better and no added value gained)? Using these reference points, where the worst value is assigned 0 points, and the best assigned 100 points, a "utility curve" can be created to describe the value space of that particular requirement.

In this case, the stakeholders told you that they would prefer no more than 19 days in the shop over the planned four-year ownership period. Ideally, they would like to keep it down to 12 days (in any shorter time, their favorite mechanic would suffer). However, should the mechanic need to be seen 26 or more days, the automobile would no longer provide the desired capability.

Based on this input, our utility curve looks like the Days in the Shop graph in the Reliability section of Figure 3. .While you have the stakeholders all together, you can work your way through each of the requirements to develop their utility curves. Some will be simple (e.g., is four-wheel drive [4WD] installed?), while some take more discussion (e.g., non-linear curve on airbags) (Figure 3).

Having completed the stakeholder inputs, you can now research the alternatives available. Using the best industry information available, other users and your own market research, you find four automobiles that may provide the solution you seek (Figure 4).

From here, it's just a matter of crunching the numbers. Determine the number of points each attribute scores from the utility curves, and apply the attribute and objective weightings. When these weighted scores are added together, the result is a normalized score for each alternative.

Figure 3. Automobile Reliability, Safety and Functionality
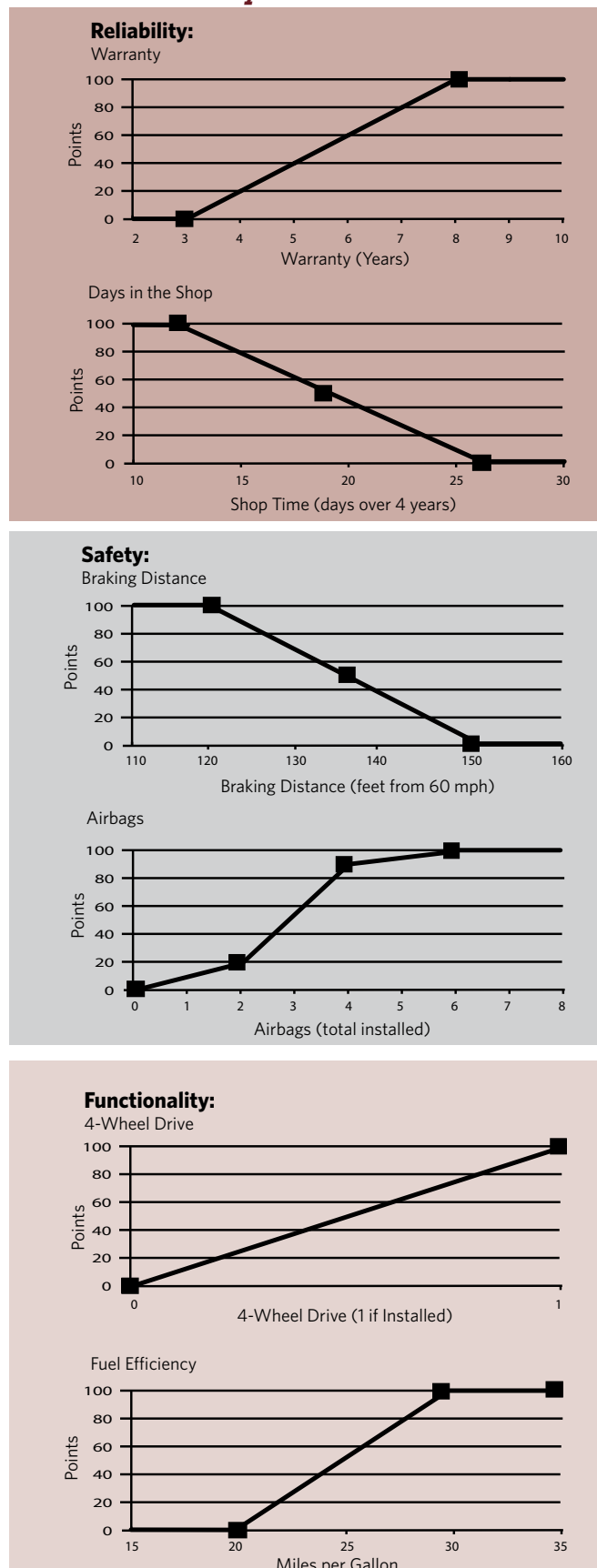
Source: The author.

Figure 4. Comparisons of Reliability, Safety and Functionality

	Reliability		Safety		Functionality		Cost
	Days in Shop	Warranty	# Airbags	Braking Distance	MPG	4WD	
Car A	14	7	5	125	23	No	$47,500
Car B	30	8	6	120	21	No	$32,500
Car C	6	3	4	130	24	No	$30,000
Car D	13	4	2	150	19	Yes	$37,500

Source: The author.

For example, first find the global weighting for the "Number of Days in the Shop" attribute by multiplying the attribute weighting by the category weighting (40% x 40% = 16%). Next, look up the utility value of "Number of Days in the Shop" for Car A from the utility curve (86). Multiply this utility value by the global weighting for that attribute (86 x 16% = 13.76).

Doing the same for each attribute and adding those scores together will yield a normalized global utility score for Car A—in this case, 68. Complete the same calculations for each car. These normailzed scores of each alternative now can be plotted against cost to give the master cost-capability plot (Figure 5).

What does this Master Plot tell us? First, Car A has the highest overall utility score. The theoretically ideal automobile would score 100 points (i.e., it meets or exceed the maximum utility scores in each category). In this case, Car A scored a total of 68 points, while Car B scored 65. From a purely requirements-based approach, Car A would be the best choice.

Second, Car C is the least expensive. Although lower in utility, it provides the most economical solution.

Figure 5. The Pareto Front in the Master Cost Utility Plot
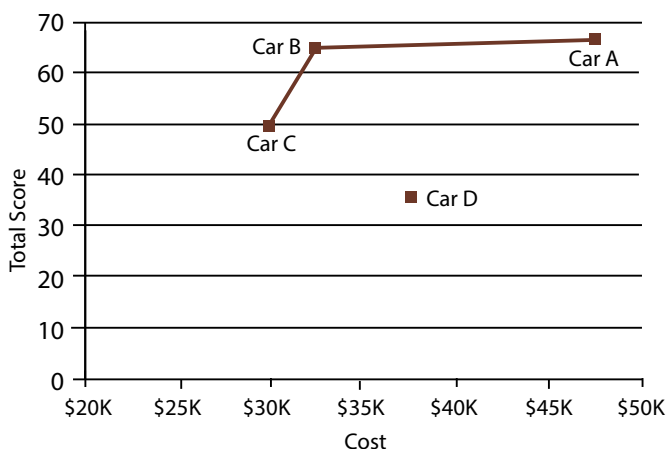
Source: The author

Third, Car B appears to provide some value at a midpoint in cost. If we assume that our ideal automobile (i.e., 100 points) also is ideally priced (e.g., $20,000), it would be located in the upper-left corner of the plot. By that reasoning, the closer we get to the upper-left corner, the better the solution. By drawing a line between those alternatives that score no lower in utility as we increase in price, we create the Pareto Front.

Any alternative that falls below this front—in this case, Car D—would be too expensive for too little capability.

This plot also is a good place to start a conversation with the user. In this case, we have three potential alternatives that provide good value for money based on the inputs provided. However, note that none of the three cars on the Pareto front has 4WD. Additionally, Car B falls above the requested maximum days in the shop. Car C provides no warranty value to the user with only a three-year warranty. This is where we can start the discussion of trading capability for cost. Note that this analysis is not sufficient as a basis for the ultimate decision. In the end, the PM must work through the trade-off discussions and use this method as one of many tools for the ultimate purchase decision.

Finally, the MADM technique provides a good tool to help define requirement value, normalize alternative performance, and start cost trade-off discussions. By having the relevant stakeholder score and weight requirements against each other at the start of requirement development, the PM can drive the user to hold early the difficult discussions on which requirements provide the greatest benefit and value. The analysis itself allows the PM to take those inputs to create a relatively objective discussion space where alternatives are scored based on cost and performance against predefined value. The Pareto Front technique provides the PM with the information key to an objective and value-based discussion on requirement trade-offs.

Additional analysis techniques can be performed, including individual requirement cost capability curves and sensitivity analyses. The U.S. Air Force Academy Operations Research Capstone class has developed a computer-based tool to help PMs complete the MADM analysis, and Air Force Materiel Command is developing a standardized process to facilitate the overall Cost Capability Analysis.

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Are You **Experienced**?

The Case for Acquisition Professional Qualification Standards

Thomas H. Miller
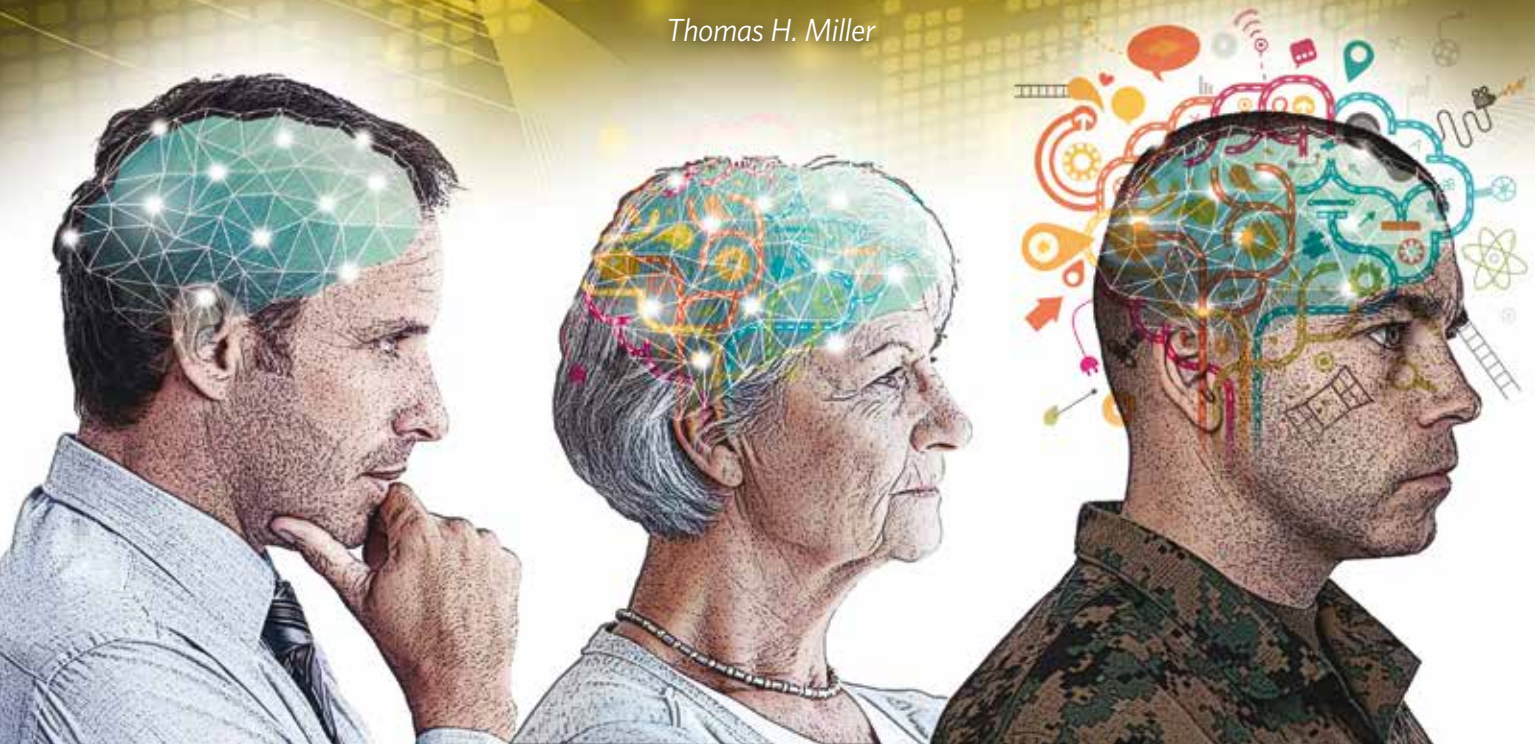
Many professions require both rigorous training and months, if not years, of hands-on practice under the close supervision of experts prior to declaring the trainee proficient enough to perform the job on their own. Physicians are required to complete years of schooling and residency training, as well as pass rigorous board examinations. Airplane pilots require hours of supervised flight time before receiving a license to fly solo.

Defense acquisition management also is a profession. Defense acquisition programs often involve significant technical risks and large amounts of taxpayer funds, and—most important—directly impact warfighter safety and operational effectiveness. Just as we would not trust an inexperienced pilot to fly us or an inexperienced doctor to treat us, we should not trust an inexperienced program executive officer, program manager, contracting officer, chief engineer, or product support manager to plan or execute a major defense acquisition program. Yet too often, inexperienced people—both civilian and military—are assigned to manage and lead all or a portion of these

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programs. It is my view that this is a proximate cause of the poor program results often reported in the news.

Why does this occur? There are many reasons, including loss of experienced acquisition professionals due to competition with private industry, low morale due to the current budget environment (furloughs resulting from sequestration, for example), heavy workloads that discourage mentoring of less experienced personnel, and the bow wave of retirements. One significant reason, however, is the lack of a clearly defined set of qualification standards that delineate experience-based proficiencies (or skill sets) required to perform acquisition jobs. Without such standards, it is difficult to define minimum requirements for senior acquisition positions, as well as to outline career paths for entry and journeymen personnel who aspire to these positions. This critical gap is negatively impacting the ability of the Department of Defense (DoD) to

program, such as a program executive officer, program manager or senior contracting officer). The memo stated that, "The selection of qualified personnel to fill KLPs is essential for the organization and the individuals filling these highly demanding positions. We cannot afford to add risk to our programs by placing unqualified or unprepared personnel into KLPs."

Kendall reemphasized the importance of this initiative in a March–April 2014 article in *Defense AT&L* magazine: "Defense acquisition professionals have a special body of knowledge and experience that is not easily acquired. ... No one should expect an amateur without acquisition experience to be able to exercise professional judgments in acquisition without the years of training and experience it takes to learn the field."

Despite this clear emphasis on qualification by the DoD's senior acquisition official, there has been surprisingly little action

Implementing a new system of requirements to supplement the DAWIA standards would place a resource burden on the military Services and other defense acquisition organizations in a resource-constrained environment.

meet ever-more-demanding warfighter requirements in a time of global demand for their capabilities. This gap must be filled by the Office of Secretary of Defense (OSD) issuing a clear system of acquisition qualification standards, and by the Service acquisition career management organizations effectively implementing that system. (Note that the term "system" is used to indicate that—in addition to the qualification standards—there should be a system to support implementation and sustainment of the standards, including automated tools for career planning, data entry, and reporting.)

Frank Kendall, Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]), has made improving the professionalism of the acquisition workforce one of the key initiatives under his Better Buying Power (BBP) policy. He emphasized this initiative in his April 2013 Implementation Directive for BBP 2.0 by stating, "At the en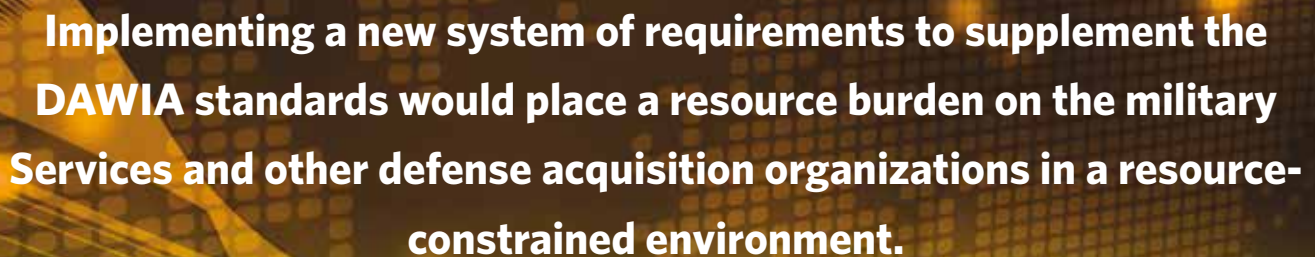d of the day, qualified people are essential to successful outcomes, and professionalism—particularly in acquisition leaders—drives results more than policy changes." This assertion was codified in a November 2013 policy memo from the Office of the USD(AT&L) titled "Key Leadership Positions [KLPs] and Qualification Criteria." This memo defined minimum requirements for KLPs (i.e., key or senior leadership acquisition positions assigned to an Acquisition Category (ACAT) I or ACAT IA

by the Office of USD(AT&L) and the Service Defense Acquisition Career Managers (DACMs) to define experience requirements that qualify an individual for an acquisition position. Even the KLP policy memo cited above vaguely defines experience as minimum years of acquisition experience, including "cross-functional competencies" such as Executive Leadership and Technical Management. The memo also discusses plans to establish "Joint KLP Qualification Boards" to prescreen and qualify a pool of candidates. To date, none of these boards has been set to work. The USD(AT&L) Sept. 19, 2014, preliminary White Paper titled "Better Buying Power 3.0" discussed establishing "stronger professional qualification requirements for all acquisition specialties," stating that "DAWIA [Defense Acquisition Workforce Improvement Act] training and certification process must be supplemented to establish a stronger basis for levels of professional qualification for all of the acquisition career fields." Yet, again, specific policy establishing qualification standards has not been issued to date.

Why hasn't the Office of the USD(AT&L) moved more quickly to implement a set of clearly defined acquisition qualification standards? There are various possible reasons. One concern is that implementing a new system of requirements to supplement the DAWIA standards would place a resource burden on the military Services and other

defense acquisition organizations in a resource-constrained environment. Implementing the system likely would include a requirement for data gathering, tracking and reporting, which could result in significant development, implementation and maintenance costs. However, when considering the cost and operational risk related to unqualified acquisition personnel, as well as the offsetting benefits of implementing the qualification standards system—including the ability to better focus training funds—the administrative costs should be considered a worthwhile investment toward achieving a more professional workforce.

Another—and perhaps more valid—reason for the delay is the difficulty of defining qualification standards for acquisition positions. The Merriam Webster dictionary defines the word "qualified" as "having the necessary skill, experience, or knowledge to do a particular job or activity." What are the necessary skills, experience and knowledge to perform jobs in acquisition programs? As stated previously, these are complex, highly specialized functional positions that require a "special body of knowledge." Also, there is something unique in the requirements for each program. For example, someone qualified to be the chief engineer for an ACAT IA information technology program may not be considered qualified for an ACAT ID weapon system program.

Given these challenges, what actions should the Office of the USD(AT&L)—and the DACMs—take to implement an acquisition qualification standards system for defense acquisition? Before I go there, I will quickly recap some previous, unimplemented initiatives that AT&L was previously pursuing, parts of which can be leveraged in implementing the new system.

Certification to Qualification (aka "C2Q"): C2Q was AT&L's initial attempt to implement the BBP initiative for improving the professionalism of the acquisition workforce. The basis for this effort was explained in a May 15, 2013, briefing as follows: "The current Defense Acquisition Workforce Improvement Act certification process ... does not by itself adequately ensure that members of our acquisition workforce are fully qualified to perform their missions ... we need to go beyond certification based on course attendance and presence in acquisition-related organizations to new standards for our workforce that include qualification through hands-on experiences in roles of increasing responsibility." This in a nutshell lays out the business case for implementing qualification standards. The briefing also identified specific implementation actions, including functional leads defining competencies (skill sets) for each functional area. In addition, the Defense Acquisition University (DAU) was to translate the competencies into on-the-job tools and processes to develop "individual qualification plans." All this was to be completed and implemented by the component organizations by July 2014. Finally, it identified several implementation attributes for C2Q and stated that "C2Q will consist of AT&L Acquisition Qualification Matrices and Qualification Assessment Tools," "Acquisition Qualification Matrices will be common across all organizations and individuals" and "Documentation will be captured in a Qualification Data Repository so that it is accessible to the individual and the organization, and will enable analysis on the workforce to occur."

Acquisition Qualification Workforce Initiative (AWQI): This initiative replaced C2Q. Similar to C2Q, its objective was "Competency-based acquisition standards that are transportable and validated/verified and can be augmented with service/component competency requirements." Its vision statement (from a May 21, 2014, briefing), quoted Katharina McFarland, Assistant Secretary of Defense for Acquisition, in part: "AQWI will transform the AWF to be qualified to perform the specific tasks their organization requires ... thru demonstrating their ability to use the theoretical classroom training in real practice under the supervision, mentoring and evaluation of a qualified supervisor or SME [subject-matter expert]." The briefing identified a four-step approach: Develop qualification standards for all 14 functional areas, cross-mapped to DAWIA levels; develop and field a system to host and capture qualifications; develop Service/organizational implementation plans; and sustain the system through updates and refinements. Initial Operational Capability for the system was targeted for December 2015 and Full Operational Capability in 2017.

Program Manager Acquisition Qualification Standards (PM AQS): These probably were the most mature of several functional area pilots run through the Office of the USD(AT&L)'s Functional Integrated Product Teams (IPTs). Under the sponsorship of the Program Management (PM) Functional IPT, led by David Ahern, Deputy Assistant Secretary of Defense for Portfolio Systems Acquisition, an AQS IPT was established in October 2011 and tasked with developing and implementing qualification standards for the PM Functional area, including processes, tools and documentation. The PM AQS IPT developed AQS workbooks that identified qualification standards for three levels of experience—entry, intermediate and expert—that coincided with DAWIA certification levels. The workbooks included three primary sections: Fundamentals—to test basic knowledge and principles needed to understand the duties to be performed, including training; Applications—to ensure an understanding of how resources and stakeholders impact the program, including key program documents and events; and Experience—which identified key roles that must be performed and actions demonstrated to ensure proficiency at tasks, including "proficiency by doing" in important program events and functional areas and learning from a mentor. All three military Services were represented on the IPT, and each subsequently conducted pilots with representative PM employees, supervisors and "certifiers" (i.e., independent subject-matter experts tasked with validating employee proficiency). Each Service conducted its pilots differently, but the response from the participants was overwhelmingly positive. Participant feedback generally summarized that AQS provided valuable structure in explaining job requirements for various levels of PM jobs, helping

them to develop "roadmaps" for their career progressions. The AQS IPT used feedback from the Service pilots to further refine and improve the AQS materials and associated tools.

So, again, what actions should the Office of the USD(AT&L) and the Service DACMs take to implement an acquisition qualification standards system for defense acquisition? Ample lessons learned from the various USD(AT&L) efforts described above—particularly from PM AQS—support the following recommended steps:

standards policy discussed above—therefore allowing for consistent application across the Services and organizations.

Throughout the implementation, the Office of the USD(AT&L) should seek to minimize resource and administrative burdens on the Services and organizations—for example, by making available funding for activities such as training and development of unique automated tools (if required). The Office of the USD(AT&L) also should establish a Qualification Standards board—including representatives from the Services and other

> **Participant feedback generally summarized that AQS provided valuable structure in explaining job requirements for various levels of PM jobs, helping them to develop "roadmaps" for their career progressions.**

- Implement AQS in a phased (crawl-walk-run) process over a two- to three-year period, starting with publishing electronic workbooks and automated tools to assist acquisition employees plan their experiential learning through creating Individual Development Plans (IDPs).
- Monitor use of the workbooks/tools, conduct surveys and additional pilots in each competency area, and utilize the data derived to further refine the workbooks and automated tools.
- Concurrently develop draft implementation policy for qualification standards and provide to the Services and other acquisition organizations for comment. This policy should define the proposed qualification standards process, including the roles and responsibilities of employees, qualifiers, supervisors and mentors. Preferably, this policy should have "teeth," particularly in terms of defining minimum qualification standards for KLP and Critical Acquisition Positions (CAPs), but should allow for flexibility in how the Services implement the qualification standards system within their organization.
- Issue the final qualification standards policy, signed by the USD(AT&L), accompanied by "road show" information events to help to gain buy-in at all levels.
- Sustain the qualification standards system through periodic updates to the policy, workbooks and automated tools. This sustainment should be supported by continuing data gathering and reporting and "lessons learned" provided through the Services and organizations and Functional IPTs.
- Implement KLP "Pre-Qualification Boards" in accordance with the USD(AT&L) November 2013 policy memo. These boards should leverage the final AT&L qualification

acquisition organizations—to oversee the process, monitor data reports and make adjustments as required.

Many ancillary benefits are anticipated from implementing a qualification standard system for the DoD acquisition workforce. The Department of the Navy PM AQS pilot survey identified three such benefits:

- The standards and associated tools can be used by individual employees as a "roadmap" to manage career planning in terms of improving knowledge and experience and proficiency in key areas. Experience currently is gained through trial and error and luck of the draw with too little mentoring and action learning inside the program and/or project office.
- The standards and tools can be used by the supervisor to prioritize employee on-the-job training and training based on position and/or program requirements.
- And the data derived from using the system can help assess knowledge gaps and focus scarce resources on training and experience gaps across the acquisition workforce.

The benefits of improving the professionalism of the overall workforce should far outweigh the difficulties and costs associated with implementing such a system. It is absolutely essential that every acquisition employee be fully qualified to perform the duties of his or her job, which DoD can ensure only through defining minimal qualification standards. As stated by the USD(AT&L) in a September 2012 policy memo: "A right-sized, requirements-based, and properly skilled acquisition workforce is vital to the Nation's military readiness, increased buying power, and substantial long term savings."

Current Status/BBP 3.0

Where does the Office of the USD(AT&L) currently stand in implementing the foregoing steps? BBP 3.0, dated April 9, 2015, adds more specifics to the initiative titled "Establish stronger professional qualification requirements for all acquisition specialties." It states, "The Department is close to completing the development of experiential/proficiency standards and tasks for each of the Acquisition Career Fields by competency. ... This career development tool focuses on the quality versus the quantity of the experience ... and provides a higher level of measurable demonstration of experience specific to position. AWQI demonstrated experience standards will be distributed to the Acquisition Workforce (via the Components) as a guide to assist in Talent Management with an emphasis on career development. ... The Components will be responsible for their implementation." It also discusses continuing implementation of Joint KLP Qualification Boards, stating, "By May 2015, the Functional Leads will identify which career field leads plan to hold KLP Qualification Boards ... and deploy the Boards by the end of December 2015."

These are steps in the right direction but are only half measures at best. For example, there is no discussion of an OSD policy implementing qualification standards or of an effort to disseminate more specific definitions of qualification requirements for KLP billets. Only time will tell if the Office of the USD(AT&L) fully commits to ensuring that all acquisition personnel are qualified for their job duties and to providing a support system to help them achieve the hands-on experience required to achieve qualification.

In the meantime, program results likely will continue to be less than optimal, and acquisition personnel will continue to focus on achieving required certifications rather than on developing a more robust individual development plan based on incrementally more challenging experiential learning. 🏰

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Defense AT&L Magazine an APEX Award Winner—Again

The *Defense AT&L* magazine in June won a 2015 APEX Award for Publication Excellence. The APEX Awards have broad national participation from publications in both the private and public sectors.

APEX 2015 Awards were based on outstanding graphic design, editorial content and "overall communications effectiveness and excellence."

This was *Defense AT&L*'s second APEX award in two years. The award was given in the category of Magazines, Journals & Tabloids—Print 32 or more Pages for *Defense AT&L*'s January–February 2014 issue (Vol. XLIII, No. 1, DAU 236), featuring a cover story on micro machines used in defense systems.

The winners for *Defense AT&L* were managing editor/senior editor of Defense Acquisition University (DAU) Press Benjamin Tyree and assistant art director Tia Gray and the magazine's Editorial, Art and Production Staffs. The other staff members involved in *Defense AT&L* production include Randy Weekes, DAU Visual Arts and Press director; Frances Battle, production manager; Harambee Dennis, art director; Collie Johnson, online supplemental content editor; Michael Shoemaker, editorial support; Debbie Gonzalez, copy editor and circulation manager; and Noelia Gamboa, editorial support.

Defense AT&L's sister DAU publication, the *Defense Acquisition Research Journal (ARJ)*, also won a 2015 APEX Award for One-of-a-Kind Publications—Government for its January 2015 issue, which focused on "Augustine's Laws," the somewhat irreverent observations of Norman Augustine, retired Lockheed Martin chairman and former Army Under Secretary, about the defense acquisition system.

There were 1,851 entries in all categories, including 390 magazines, journals and tabloids from corporate and government publishers at the national and state levels. Other award winners included Ford Motor Company's *Product Information Book*; American Council of Engineering Companies; AARP (American Association of Retired Persons); Computer Sciences Corp.; Merrill Lynch Clear Site; Colorado State University; NASA Armstrong Flight Research Center; the *VFW Magazine*; Northern Virginia Electric Cooperative; *REALTORS* magazine; and the Military Officers Association of America.

APEX Awards are sponsored by the consultants at Communications Concepts Inc., of Springfield, Virginia.

DAU President James P. Woolsey said: "The magazine is an important means by which the workforce receives and understands the policy of our leadership. ... I can tell you that the magazine is still one of the most ubiquitous reminders of what DAU is, what we do, and how well we do it. ... As with the *Defense AT&L* magazine, the high quality of the *ARJ* is an important way to present DAU to our stakeholders. Double congratulations to all!"

Boosting System Reliability

Through Modeling and Simulation

Lisa Carroll with Keith D. Adkins, Jr. ■ *Mark J. Brudnak, Ph.D.* ■ *Michael F. Pohland*

To maximize return on investment (ROI) in the face of increasing budget constraints and failure of half of all Army programs to demonstrate established reliability requirements, test and evaluation (T&E) programs must be executed more efficiently and incorporate more aggressive reliability growth techniques. One way to accomplish this is by leveraging existing modeling and simulation (M&S) tools, including purely computer-based as well as hardware-in-the-loop (HWIL) tools.

ROI for Reliability Improvements and Test Efficiencies

The ROI benefits can be characterized as cost savings or avoidance, shortened schedule, better performance and increased safety. Greater ROIs can be realized when improvements are made early during the design-for-reliability phase of development. Based on numerous analyses across many military platforms, any investments in reliability improvement almost always are paid back over the system life cycle with very large returns.

Efficiency-driven T&E decisions should be considered in light of the near- and long-term ROI and capability changes. Such analyses often can be performed quickly and at little cost. The analyses provide overall context and justification for the efficiency choices selected.

Early design-for-reliability activities, including finite element modeling, dynamics modeling and simulation, and component fatigue analysis can help predict failure

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Figure 1. M&S Utilization in the Reliability Test and Evaluation Paradigm
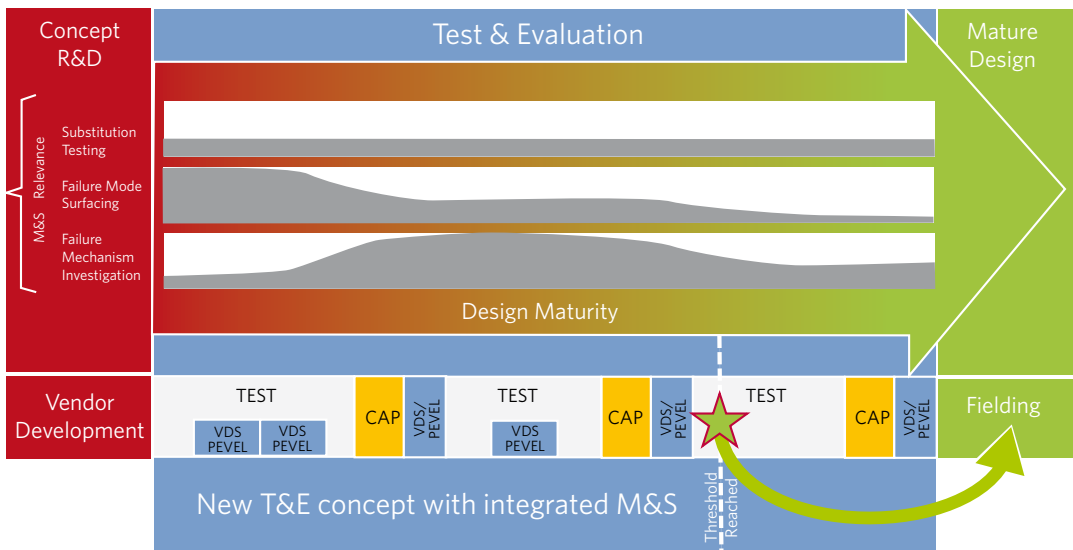
re-evaluated to yield maximum ROI. As illustrated in Figure 2, design complexity and maturity need to be considered for a particular system.

For instance, Joint Light Tactical Vehicle (JLTV) can be considered a complex prototype. Whereas, Family of Medium Tactical Vehicles re-buy is a less complex and highly mature system. In the latter case, system reliability characteristics are well known, lending to targeted testing of known areas for reliability concern to evaluate manufacturing changes that come with alternative vendor selection. In the same respect, this paradigm could also apply to Engineering Change Proposals.

modes based on a number of mechanisms and also can be used to evaluate efficiency of proposed design changes. Early incorporation of physics-of-failure analyses will allow reliability improvements during the design-for-reliability phase of development when they are much easier and cheaper to do. Design changes become more expensive and difficult to complete as the system matures and becomes more hardened.

Proposed Integration of M&S Capabilities

High system reliability is achievable through robust design for reliability, expedited surfacing of system failure modes through efficient and targeted testing, and effective failure mode management to design and/or implement highly effective fixes.

In conjunction with traditional reliability testing, both computer-based and physical vehicle-simulation capabilities provide an opportunity for better failure mode surfacing, investigation and resolution. Figure 1 illustrates how, in conjunction with traditional durability testing, U.S. military vehicle simulation capabilities can be leveraged to expedite reliability T&E. By leveraging M&S to expedite failure mode surfacing, investigate failure modes, and to engineer more timely and effective fixes, the opportunity exists to achieve early required system reliability, allowing for a potential off-ramp and early fielding.

Design Maturity and Complexity: Tailoring the M&S Approach

As a U.S. Army wheeled vehicle program progresses through the acquisition cycle, use of M&S capabilities to surface, investigate and target failure modes needs to be

Leveraging Existing Army Vehicle M&S Capabilities

Programs that utilize the Army's computer-based and HWIL M&S tools have many benefits: They improve initial system-level reliability for start of the engineering and manufacturing phase, accelerate surface failure modes, improve accuracy of failure mode root cause analysis conclusions, promote accelerated reliability growth, improve the likelihood of

Vehicle Durability Simulator Testing at Aberdeen Testing Center in Maryland.
U.S. Army Photo.

demonstrating system reliability requirements (i.e., reduce program risk) and reduce the traditional "wheels-to-dirt" mileage for vehicle testing.

Computer-Based M&S Tools for T&E of Vehicles

The Army Materiel Systems Analysis Activity (AMSAA) and the Army Research and Development Centers (RDECs) use physics-based computer-aided engineering software to model, simulate and analyze mechanical and electrical systems in response to reliability questions from the T&E and Acquisition communities. This reliability analysis process enabled by computer-based M&S is known as Physics-of-Failure (PoF).

Decision makers utilizing PoF analysis support consist of representatives from the T&E and Acquisition communities for platforms including, but not limited to, Abrams, Stryker, Mine-Resistant Ambush Protected (MRAP), Chemical and Biological Protective Shelter, Dry Support Bridge, M1000 trailer, Small Unmanned Ground Vehicle and various Tactical Vehicles. Analysts apply PoF M&S to identify the impact to component or system reliability when equipment or usage changes. Additionally, PoF M&S can be used to predict the root cause of failure for components failing in reliability testing or in the field. New materiel systems also are analyzed to develop baseline reliability predictions that provide focus areas for initial design and testing. Regardless of application, utilizing PoF M&S in product development and T&E reduces decision risk.

In addition to computer-based M&S tools, HWIL M&S capabilities also are essential. Numerous HWIL facilities exist that simulate realistic operational environments and stresses in order to identify potential failure modes and reliability issues. Four of the Army's simulators are outlined below.

Army Vehicle Physical Simulation Capabilities

Power and Energy Vehicle Environment Lab (PEVEL): The PEVEL is located at the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) in Warren, Michigan. The PEVEL is a climatic

Reconfigurable N-Post Simulator Testing at the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) in Warren, Michigan.
U.S. Army Photo.

dynamometer test laboratory. The climatic chamber has the capacity to produce a wide range of temperatures, humidity levels, wind speeds and solar loads and handle both wheeled and tracked vehicles. The PEVEL system was designed for vehicle cooling system evaluation, road load simulation, and accelerated life testing of power-train systems.

Figure 2. Tailored M&S Usage: Considering Design Complexity and Maturity
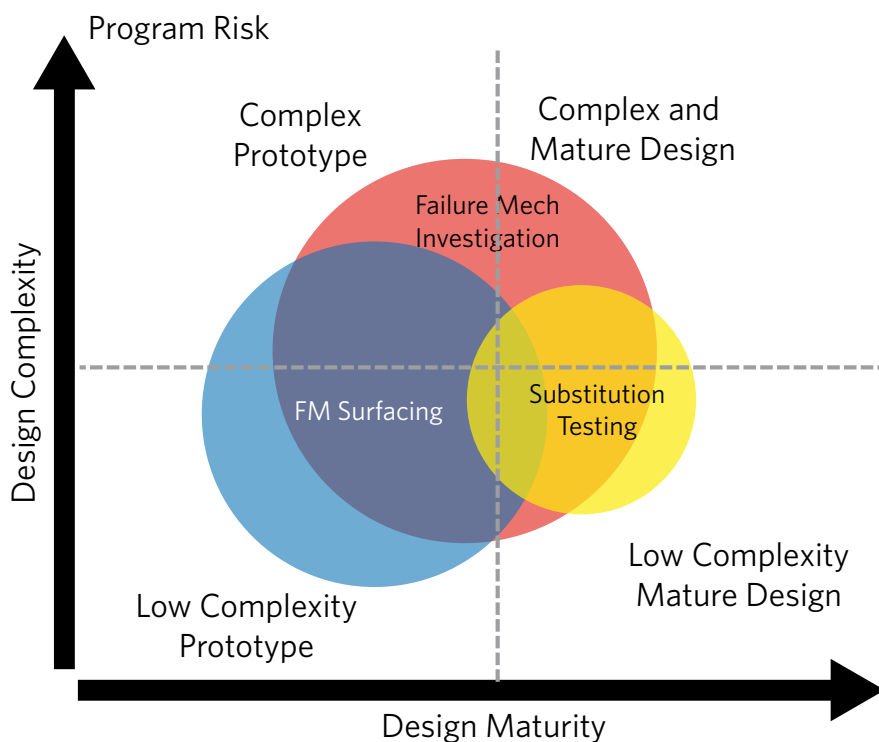
Reconfigurable N-Post Simulators (RNPS): The Ground Vehicle Simulation Laboratory at TARDEC contains two types of hydraulically powered RNPS capable of performing whole-vehicle durability tests on a wide range of military vehicles. The laboratory has performed tests on High Mobility Multipurpose Wheeled Vehicles (HMMWVs or Humvees), MRAPs, Strykers, Light Armored Vehicles, and other vehicles, to validate and verify the durability of whole-vehicle and component systems such as armor kits, frames and suspensions. The simulators use sophisticated control methodologies to reproduce structural dynamics experienced from actual field data or virtually generated terrain displacement profiles replicating multiple terrain types including Aberdeen Proving Ground (APG) Maryland, and Yuma Proving Ground (YPG) Arizona terrains. The RNPS simulators consist of a small HMMWV-class simulator and a significantly larger heavy-duty-class simulator, which can be configured to support a two to six-axle vehicle.

Roadway Simulator (RWS): Aberdeen Test Center (ATC) Roadway Simulator is the world's largest vehicle dynamics test simulator. It is a vehicle-in-the-loop simulator that replicates ground velocity vectors beneath each vehicle tire, thereby satisfying Newton's equations of motion. Test capabilities include steering and handling, power train performance, shock and vibration, braking and fuel economy. The RWS has performed

Performance Validation Testing in the Power and Energy Vehicle Environment Lab at TARDEC.
U.S. Army Photo.

Figure 3. Returns on Investment Based on Army Materiel Analyses Systems Analysis Activity

Category	Value
wheeled 1	4
shelter	8.1
bridge 1	11.7
bridge 2	17.5
bridge 3	21.0
wheeled 2	24.8
comms 1	25.3
trailer	29.8
comms 2	34.3
wheeled 3	46.2
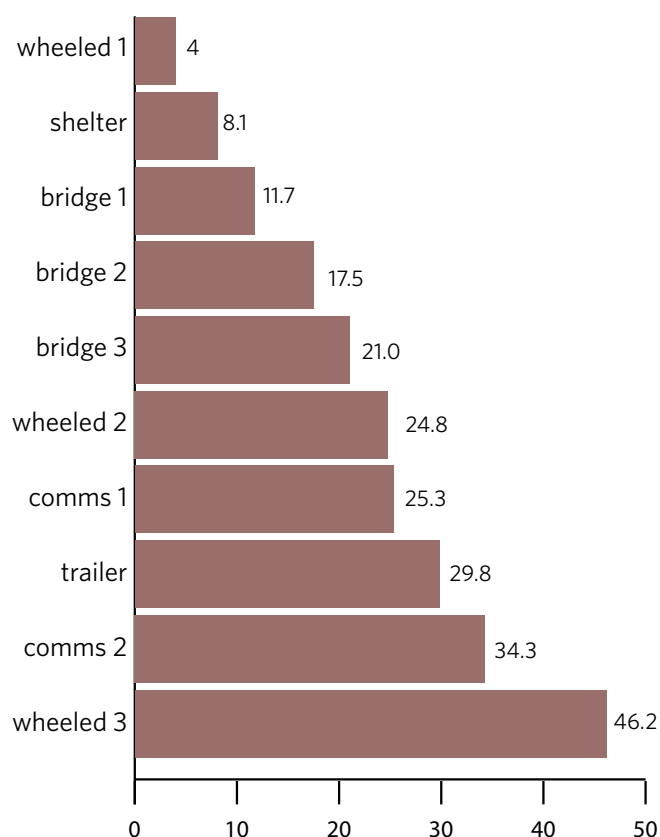
tests on HMMWV, JLTV and several other military vehicles, as well as a variety of commercial vehicles.

Vehicle Durability Simulator (VDS): The Vehicle Durability Simulator has the capability to replicate six degree-of-freedom wheel forces and accelerations experienced on the test course. The laboratory has performed several tests on HMMWV vehicles, a proof of concept on a JLTV prototype during the technology demonstration phase, and a MRAP All-Terrain Vehicle rear suspension test. The simulator replicates field data collected at military proving grounds.

Conclusion

M&S has significantly benefited numerous programs across many military platforms. M&S has accelerated fielding, verified design enhancements and reduced testing costs. M&S continues to result in substantial ROI as shown in Figure 3.

For any major weapon system, a 10 percent improvement in reliability results in tens of millions to billions of dollars in savings over the life cycle. Yet, not every program is fully taking advantage of M&S tools. As more programs reach out and use best-of-class M&S methods, the military will reap significant ROI through increased reliability and reduced life-cycle costs.

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Turning "Desirements" into Requirements

Charles Court

Because we are humans, everything we need either starts or finishes with something we want. As students, we could take the bus to school, but we wanted a car. Moreover, we did not want just any car. A Corvette, a Porsche or a Mustang would do much better. (The author wanted the Aston Martin from the movie "Goldfinger." You know: The one with the ejection seat, automated license plates and electronic tracking.) On the professional military level, the Services and agencies fall into the same trap. There are things we need, but many more things we want. Why settle for tanks, ships and aircraft if we could have cloaking devices, The Death Star, Mr. Fusion and phasers?

One way to look at this conundrum is to see the difference between "desirements" and requirements. The word "desirement" is new. You cannot find it in most published dictionaries. The online dictionaries define "desirement" as

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something desired but not absolutely required. Unfortunately, the word "requirement" means different things to different people. As the Defense Acquisition University (DAU) develops and teaches classes, faculty members hear much about "'Big R' Requirements" versus "'little r' requirements" and volumes about "requirements creep." The challenge is how to turn desirements into requirements. How can requirements managers make the case that something is absolutely required?

There are several schools of thought. Some contend that a requirement is not a requirement until it is funded. Others argue that a requirement is nothing until staffing is complete and the appropriate authorities validate it. Still others contend that requirements can exist only under a Program of Record where there is overlap between the three Department of Defense (DoD) management systems of requirements, acquisition and funding. The most confounding approach is, "The President/General/Admiral wants it."

Over the course of many classes and Mission Assistance efforts, the DAU requirements faculty contends that a requirement has the support of a continuing process of analysis. A desirement lacks such objective analysis. To begin the necessary objective analysis, managers must understand the level of the requirement. Next, a Capability Based Analysis (CBA) must begin the intellectual support behind the requirement. Finally, requirements must evolve and adapt to changing threats and to lessons learned during development. Throughout this evolution, requirements managers and program offices must keep the requirements focused. Everyone must avoid the messy, time-consuming and expensive changes everybody calls requirements creep.

Different Levels of Requirements

On the grandest scale, decision makers should ask: How can we prevent any conflict? How can we turn potential enemies either into noncombatants or (better still) into friends? At the extreme level, DoD has two essential requirements:

• Neutralize the enemy.
• Protect friendly forces and noncombatants.

Essentially, in combat we want the enemy defeated and all of our troops and all of our friends to come home unharmed. Achieving these two overriding goals gets complicated quickly. How do we find and identify the enemy? What do we need to know about the enemy's intent and capability? How do we determine that intent and capability? What means do we have to defeat the enemy? How do we communicate with our forces? What steps will protect our forces, our allies and the noncombatants? How do we get ourselves and our equipment into the fight and then back home?

Raising such questions helps us identify different levels of requirements. The "Big R Requirements" include identifying the mission and answering the broad questions above. These "Big R Requirements" lead to "small r requirements" that specify

the capabilities our troops need to accomplish various missions in diverse operating environments. For example, what range, payload and speed do transport aircraft need either to respond to a crisis or to resupply a sustained effort? What meets the military utility as opposed to excess, surplus and overpriced capability frequently derided as "goldplating"?

Start with Analysis—The CBA

So how does a manager turn that desirement into a requirement? First, recognize the difference between the desirement ("I want a new tank/ship/airplane/missile") and a required capability ("We need to resupply our troops"). The thought progression usually goes through four steps:

• What do we want?
• What do we need?
• What do we need to be able to do?
• What can we afford?

Notice how these steps start with a question centered on some hardware or service and then move to a capability. The thought process begins with "we want something new," considers the essential "what we need," and finally recognizes the capability with a statement such as, "We need to determine the enemy's intent." The process must return to feasible solutions when we face the budgetary limits. The DoD has a huge budget, but we cannot spend all that money on just one thing.

Good analysis to support this thought process becomes simple and complicated at the same time. The steps are straightforward and repeatable. However, each problem has unique elements and technical challenges. Diverse technical problems call for subject-matter expertise from different disciplines with different terminologies, different priorities and different points of view. Here is where leadership and experience count. An analysis team leader must know the steps, get the necessary support and schedule everything to provide a timely answer.

At the very beginning, the leader and the analysis team must identify the mission or problem the analysis must address. To keep things on track, everyone must agree on the study scope: Is this analysis a complicated new mission area or a straightforward recapitalization of aging equipment? Are there previous studies that help this effort? How much rigor must this team put forth to prove that its analysis presents essential requirements and not just documented desirements?

Once the team determines the study's preliminary needs, the analysis identifies the needed capabilities, the capability gaps, and the operational risks on a prioritized list. Most teams face the same questions: What do we need to do that we cannot do now? What do we need to do better? What are the problems and the risks?

In the final CBA step, the team considers alternative solutions. Any action assumes associated costs and often initiates risk. Perhaps it is smarter to do nothing at all. If too much

risk emerges from doing nothing, the next consideration is a nonmateriel solution. Perhaps changing Doctrine, Organization, Training, Leadership, Personnel, Facilities or Policy can solve the capability gap problem. Perhaps DoD does not need to develop anything new, but rather take a nondevelopmental approach by ordering more of an existing weapon or system. The acronym DOTmLPF-P sums up this overall non-materiel approach—Doctrine, Organization, Training, materiel, Leadership (education), Personnel, Facilities or Policy (DOTmLPF-P). The m is not capitalized because it represents nondevelopmental hardware, which differentiates it from developing something new.

> **The warfighter—the man or woman who goes into harm's way—has every imperative to expect much of us as requirements managers, program managers, and resource specialists.**

The final alternative is to develop a new system or a new technology. Developing something new almost always is expensive. Under typical tight budgets, assessment teams must wonder when to consider the cost of a particular solution. The DoD management systems wisely separate requirements generation from systems acquisition. Rather than have the CBA team worry about costs, the thinking today is that the requirements team members are not cost or development experts. The essential CBA task is to identify the problems and the alternative solutions. Let the acquisition experts develop the cost estimates so the decision makers have the most credible information. This approach also helps avoid the temptation to ignore a capability gap because the solution may be too expensive.

The CBA Is Just the Beginning

The product of a CBA can be either an Initial Capabilities Document (ICD) or a DOTmLPF-P Change Recommendation (DCR). The ICD supports developing a materiel solution; a materiel solution usually calls for additional nonmateriel changes such as new facilities and new training procedures. Hence, a new materiel development usually has a supporting ICD and a supporting DCR. If the CBA recommends a nonmateriel solution, a DCR will suffice.

Completing the CBA does not finish analysis or requirements development. Arguably, analysis never is finished because requirements managers must keep refining those requirements to respond to changes in threats, to apply lessons learned during system development, and to prevent requirements creep. The requirements listed in the ICD usually have a minimum value. Subsequent requirements documents, the Capabilities Development Document (CDD) and the Capabilities Production Document (CPD), propose refined capability requirements in the form of Key Performance Parameters (KPPs), Key System Attributes (KSAs) and Additional Performance Attributes (APAs).

The specifics of the KPPs, KSAs and APAs can get programs into trouble when operational considerations lead to derived requirements. For example, an aircraft may have a requirement to operate off an aircraft carrier. Carrier operations limit aircraft weight and size. The one requirement for carrier operations now leads to the two additional requirements to limit aircraft weight and limit aircraft size. A vivid example involves a missile that needs to fly at a very high Mach number. High speeds mean high temperatures. High temperatures mandate expensive materials such as titanium. The need to fly at a high Mach leads to a derived requirement that the development contractor must make the missile out of titanium or something even more exotic. (Unobtanium, anyone?)

The great risk in both examples is that the requirements managers and the program managers may overlook alternatives and compromises. Revised operational concepts could allow for different carrier-based aircraft or mission profiles that do not involve carrier operations. A slower, cheaper missile would allow less research and development, simpler test and evaluation, and more production. It is all too easy to make the illogical leap, "The user needs a high Mach number. That means the user requires titanium. Titanium is a requirement." What matters here is the operational capability. In this example, the user asked for high speed; the user did not tell the developer how to achieve that high speed. The need for high speed may not be as important as other considerations such as accuracy, availability and reliability. Requirements managers, program offices and developers must be open to these kinds of tradeoffs.

A Good Requirement's Characteristics

As systems development progresses, the requirements documents support the succeeding milestones and the requirements become more specific. Ideally, the requirements manager works with the program office to apply the lessons learned from the development phases. These lessons learned should combine with the results of the analysis so the

requirements describe the overriding military or operational utility. Good requirements avoid the common pitfalls of being too vague, subjective, expensive and restrictive.

Bad requirements can be vague, subjective, expensive and restrictive. Effective requirements have the following characteristics:

- Measurable—The requirement must be quantifiable and verifiable through inspection, analysis, demonstration, simulation or testing.
- Attainable—The requirement must be feasible and achievable with today's technology, the available time, and the available money.
- Necessary—The requirement must be necessary to accomplish the mission; there is no room for the frivolous or the "nice to have."
- Correct—The requirement must accurately describe the capability the program office and the developer need to deliver.
- Unambiguous—The requirement is not open to interpretation; everyone—from the requirements shop, the program office, and the contractors—can agree on what to develop and deliver.
- Orderly—Requirements are clearly prioritized so the program office can make trade-offs.
- Organized—Requirements are grouped into categories to avoid duplication, inconsistencies and contradictions.
- Results-Oriented—The requirements are based on operational capabilities; they describe what the system needs to do.

Clear, effective requirements allow the requirements managers to work with the systems engineers to develop specifications for the contractors. Then industry can develop, produce and support the equipment the warfighter needs.

Bring New Systems Together

At every level we must remember how each Service and each agency is part of a greater whole. Many capabilities come together to serve the warfighter and to defend the nation. As technology moves forward, new technologies often have the potential to do what once appeared impossible. Our ability to innovate and to apply technology is among our greatest strengths. The great challenge remains communicating what the warfighter needs to do and what the acquisition system—with its laboratories, engineers and contractors—can provide on cost, on schedule, with worthy performance.

None of these communications steps are easy. The abilities to innovate and to imagine often begin tortuous processes to turn ideas into capabilities. The teamwork of multiple disciplines must come together to develop results. The communications and development processes become rigorous and time-consuming because we expect so much from ourselves, from our partners, and from the warfighter. In turn, the warfighter—the man or woman who goes into harm's way—has every

imperative to expect much of us as requirements managers, program managers, and resource specialists.

We probably all have stories about how someone in our chain of command expressed a desirement and expected us to make it happen. We have all heard stories of how analysis gave an answer the boss did not want. Nevertheless, many steps must combine the contributions from many disciplines to complete sound analysis, document the need for new or for improved capabilities, get the necessary documentation validated, and get a new effort funded. A subjective desire for something new must evolve into a sound objective requirement as we develop new capabilities that continue to allow our forces to prevail.

Experienced leaders know that good communications takes time and effort. Good communications, solid analysis and insight into the potential pitfalls remain at the center of any effort to turn desirements into requirements. 🙰

MDAP/MAIS Program Manager Changes

With the assistance of the Office of the Secretary of Defense, *Defense AT&L* magazine publishes the names of incoming and outgoing civilian and military program managers for major defense acquisition programs (MDAPs) and major automated information system (MAIS) programs. This announcement lists a recent change of leadership.

Navy/Marine Corps
CAPT Robert Croxson relieved **CAPT Andrew Williams** as program manager for Multifunctional Information Distribution System (PMA/PMW-101) on May 20,.

Steven Pinter relieved **Gary Prosser** as program manager for Medium & Heavy Tactical Vehicles (PMM-206) on June 28.

Air Force
Col Don Hill relieved **Col Gregg Kline** as program manager for the OPS C2 System Program on May 22.

Col William Bell relieved **Col Patrick Burke** as program manager for the Munitions Sustainment program on June 28.

Col Scott Jones relieved **Col Ryan Britton** as program manager for the Intercontinental Ballistic Missile (ICBM) Systems program on June 30.

Col Timothy Bailey relieved **Col Edward Koslow** as program manager for the F-15 System program on June 30.

Did the Navy Get **Taken**?

John Krieger

Navy Times
A GANNETT COMPANY

Navy pays 1 cent to scrap ex-carrier Saratoga

"**T**hink. The first responsibility of the acquisition workforce is to think. We need to be true professionals who apply our education, training and experience through analysis and creative, informed thought to address our daily decisions. Our workforce should be encouraged by leaders to think and not to automatically default to a perceived school solution just because it is expected to be approved more easily. BBP 2.0, like BBP 1.0, is not rigid dogma—it is guidance subject to professional judgment."

That was how Under Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall described the first of a set of "key overarching principles that underlie BBP [Better Buying Power]" in his April 24, 2013, memorandum to the Department of Defense (DoD). He said BBP 2.0 should be approached with those principles in mind. In his White Paper introducing Better Buying Power 3.0, Kendall continued to emphasize the vital importance of thinking, ". . . nothing is more important to our success than our professional ability to understand, think critically, and make sound decisions about the complex and often highly technical matters defense acquisition confronts."

Krieger *is an intermittent professor of contract management at the Defense Systems Management College's School of Program Managers at Fort Belvoir, Virginia, and is an independent consultant with more than 35 years of government experience in contracting and acquisition.*

In Kendall's service, this, then, is a think piece. Although I personally loathe the phrase, it is designed to make you "think outside the box." For those of you who may not be with DoD, let me suggest that you also should be thinking.

The Deal

There was a small article in the May 8, 2014, edition of the *Navy Times* titled "Navy pays 1 cent to scrap ex-carrier *Saratoga*." The story, below, was about the Navy decommissioning the aircraft carrier *Saratoga* and negotiating a contract for scrapping the ship. Here is the article in its entirety:

> The decommissioned aircraft carrier *Saratoga* is officially headed for the scrapyard after the Navy paid one penny to a Texas scrapyard to dismantle the 81,101-ton flattop that once blockaded Soviet ships during the Cuban Missile Crisis.
>
> *Saratoga* will head to Brownsville, Texas, later this year for scrapping by the company ESCO Marine, Naval Sea Systems Command said in a Thursday news release.
>
> The *Saratoga* is the second of three conventionally-powered carriers destined for scrapping. All Star Metals received the *Forrestal* earlier this year, also taking on the flattop for a penny. A third contract is pending for the *Constellation*, with International Shipbreaking Ltd.
>
> The one-cent payment is the lowest the Navy can offer to the company to take the flattop off the fleet's hands. ESCO Marine will keep the profits from the sale of the scrap metal.
>
> The carrier, the sixth *Saratoga* in U.S. history, was decommissioned in 1994 after 38 years in service. Despite attempts to turn it into a museum, the Navy decided in 2010 that none of the applications to turn it into a public display was up to par.
>
> In addition to its pivotal role in the 1962 Cuban Missile Crisis, "Super Sara" was also involved in a 1986 airstrike against Libya.
>
> The carrier is expected to make its way to Texas this summer from its current berth at Naval Station Newport, Rhode Island.

Your reaction, like the editors of the *Navy Times*, presumably, is probably, "Gosh, the Navy got a great deal on that one." After all, how much must it cost to dismantle and scrap a more than 50-year-old aircraft carrier? The costs associated with environmental issues alone must be astronomical—well, at least significant. It is a good thing for the Navy that the Courts and Boards take a rather elastic view of what constitutes adequate consideration (see below), as they will only pay ESCO Marine one cent. According to the *Government Contracts Reference Book* (Fourth Edition):

> **CONSIDERATION:** A performance or return promise that is the inducement to a contract because it is sought by the PROMISOR in exchange for his promise and is given by the PROMISEE in exchange for that promise. Restatement (Second) Contracts

§ 71 (1981). . . . The requirement for consideration does not require that what is relied upon for consideration be equivalent in value to the promise; the consideration need only have "some value."

Based on the above, you might feel safe in presuming that the Navy negotiated a very, very good deal. You might be right. Might be.

Yard Sales

My reaction, on the other hand, was what some people might consider cynical, "Did the Navy get taken?" The key to my reaction is two sentences, "The one-cent payment is the lowest the Navy can offer to the company to take the flattop off the fleet's hands. ESCO Marine will keep the profits from the sale of the scrap metal." First, let's deal with an acquisition subtlety that is apparently lost on the article's author: ESCO Marine is the offeror; it makes the offer. In the give and take of discussions or negotiations, the Navy could have made one or more counteroffers to what ESCO Marine originally offered.

Now, let's deal with another, more important, subtlety. Even if the terminology were correct, why is one cent the lowest offer the Navy can make? Why should the Navy have paid even one red cent? (Sorry, couldn't help myself.) Consider the Saturday morning yard sale. In many instances, when we have things we don't need or want, we just toss them. When we have accumulated an excess number of items we don't want (e.g., clothes, dishes, books, DVDs) we have a number of ways to divest ourselves of them. One solution, of course, is to just throw them in the trash. If there is a lot of stuff, we may have to do this incrementally or pay to have it hauled away. If we believe there is still some residual value, we may contribute the stuff to a charity and take a deduction on our income taxes.

Another alternative, if there is residual value, is to hold a yard sale or garage sale. You are all familiar with the yard sale, where we get other people to pay us for the privilege of hauling off our unwanted goods, our junk, our trash. In some cases, those people, especially the Early Birds, will turn around and resell our stuff for a profit—if they are really keen eyed and knowledgeable, for a significant profit. Think "Antiques Roadshow" sort of profits.

Why didn't the Navy hold a "Shipyard Sale" or "Ship Yard Sale"? Instead of paying one cent for scrapping the *Saratoga*, why didn't the Navy charge the contractors for the privilege of scrapping the carrier? Think of timber contracts, where the Forest Service charges contractors for the right to cut down trees. Think of concessions contracts, where the National Park Service charges contractors for the right to run concessions on government property. Instead of allowing ESCO Marine to "keep the profits from the sale of the scrap metal," shouldn't the Navy have been trying to get back as much of that value as possible? Presumably, this acquisition was negotiated competitively. When all is said and done, All Star Metals and International Shipbreaking Ltd. were successful

offerors on similar contracts. Shouldn't the Navy have been able to use the benefits of that competition to get the best deal for the government?

(Note: Some additional money could be made by selling pieces of the *Saratoga* as souvenirs instead of scrap. I personally have souvenirs from or of several ships, including the USS *Constitution* and the USS *Constellation*.)

The USS *Constitution*

The reason for my reaction is because of a story, perhaps apocryphal, of the USS *Constitution* turnaround. For those unfamiliar with the story, we should begin with a discussion of the turnaround, which last occurred on July 4, 2014. The purpose of turning around the USS *Constitution* is to equalize wear from tidal and stream effects on both the port and starboard of the vessel. Now, according to the story, it formerly cost the Navy a bundle to turn around the *Constitution*. But then the winner of the competition started to advertise that it had won the

the fedbizopps Website turned up solicitations for repositioning and turnaround services for the USS *Constitution*, but no award announcements.

Whether or not the story of the turnaround of the USS *Constitution* is true, shouldn't we use it as an archetype in appropriate circumstances? I contend that is what a thinking member of the acquisition workforce would do. That is exactly what Kendall would want us to do in discussing the role of the Acquisition Team in the "Guiding Principles" of the Federal Acquisition Regulation (FAR). Leeway is needed to take an expanded view of what can be accomplished by thinking critically, FAR 1.102-4(e):

> The FAR outlines procurement policies and procedures that are used by members of the Acquisition Team. If a policy or procedure, or a particular strategy or practice, is in the best interest of the Government and is not specifically addressed in the FAR, nor prohibited by law (statute or case law), Executive order or

Think of concessions contracts, where the National Park Service charges contractors for the right to run concessions on government property. Instead of allowing ESCO Marine to "keep the profits from the sale of the scrap metal," shouldn't the Navy have been trying to get back as much of that value as possible?

contract. In the next competition, the competitor significantly undercut the incumbent, thus winning the "bragging rights." The downward spiral continued until one year the winning offer was, amazingly, just $1. However, the story then turns truly amazing, because in the next competition the Navy was paid for the rights to turn around the *Constitution*, sort of like on a concessions contract. The next contract brought the Navy even more money. Unfortunately, I have been unable to verify this story, although I went to a considerable effort—well, at least a moderate effort.

My attempt to verify the story began in what I consider an easy way, I asked my oldest brother. This was done for two reasons: He lives in the Boston area and he has been involved in acquisition much longer than I. He told me there had been no stories in the *Boston Globe*, even though it was time to turn around the ship. He indicated he had heard the same story when he was in acquisition training. I tried to verify the story with the USS *Constitution* Museum, which could not do so, but, referred me to the U.S. Navy's Public Affairs Officer for the USS *Constitution*. He was unable to verify the story, but referred me to the fiscal officer for NHHC (i.e., Naval History and Heritage Command) Detachment Boston. As of publication date, there has been no response from NHHC. My search of

other regulation, Government members of the Team should not assume it is prohibited. Rather, absence of direction should be interpreted as permitting the Team to innovate and use sound business judgment that is otherwise consistent with law and within the limits of their authority. Contracting officers should take the lead in encouraging business process innovations and ensuring that business decisions are sound.

Admittedly, that is not totally opening the floodgates. The Acquisition Team does have to follow the law, which is our box. After all, as Charles Laughton said as Inspector Javert, the icy policeman in the classic 1935 film adaptation of "Les Misérables": "Right or wrong, the law is the law and it must be obeyed to the letter." But, if the Acquisition Team thinks critically, and takes innovative approaches to what may seem mundane or routine matters, we can help to achieve Better Buying Power.

One last thought: If the Navy got taken in the ESCO Marine negotiation, it also got taken in All Star Metals and International Shipbreaking Ltd. negotiations, other acquisitions negotiated for one cent. 🖋

The Defense Systems Trade Show

An Industry Perspective

Lawrence E. Casper

This is the third in a series of articles by the author on international defense sales. The first two appeared in the September–October 2014 and March-April 2015 issues of Defense AT&L *magazine.*

ndustry spends significant capital on hundreds of trade shows and exhibitions throughout the United States and the world. This article discusses ways to gain the most benefit from trade show participation and attendance. The article is based on the author's experience in international arms sales, and the methodology discussed is intended to provide industry trade show attendees (and, to some degree, U.S. Government participants) an approach to trade shows and exhibitions in order to achieve maximum benefit.

Casper *is a former U.S. Army colonel who is retired from defense industry management. He has authored a number of articles in defense and military Service-oriented journals as well as the book* "Falcon Brigade–Combat and Command in Somalia and Haiti' *(Lynne Rienner Publisher, January 2001).*

To appreciate the magnitude of industries' expenditure on exhibitions, one only has to attend the Paris Air Show at Le Bourget Airport in north Paris. Here you will find industry-sponsored two-story chalets assembled in a matter of days and occupying the equivalent of several football fields. These temporary structures decorated in the companies' liveries are equipped with formal restaurants, observation decks, cutting-edge displays, multiple meeting rooms, press accommodations along with strategically placed beverage bars throughout. Here multimillion-dollar deals are introduced, aggressively promoted and often signed.

My first exposure to a global defense trade show was the International Defence Exhibition and Conference (IDEX), billed as one of the world's largest defense systems exhibitions. The company displays occupied several huge exhibit halls and acres of real-estate at the International Exhibition Centre in Abu Dhabi, United Arab Emirates. There was excitement and intrigue attending such a massive display of global defense equipment—everything from camouflage, radios and revolvers to missiles, tanks and helicopters. I was awed by the hundreds of foreign government officials, military officers and seemingly endless numbers of businessmen meandering throughout the exhibit, all with an air of importance. I walked away from my first trade show having accomplished little business but thrilled by the experience and the venue.

The Environment

Industry constantly seeks ways to quantify the benefit of trade show expenditures and often struggles with the lack of return on investment leading senior management to question: Should we have a presence at the show? Is it worth the cost? Should we reduce our footprint? What is the political impact if we do not exhibit? Should we even have employee attendance?

In reality, if the company is a major global player (e.g., Lockheed Martin, Boeing, Raytheon, BAE Systems, Airbus), its presence is expected at the larger shows. The absence of such a company would be noted. On the other hand, smaller trade shows often are attended as a matter of habit. The smaller shows become events in which the company has participated for years, maybe decades, and continues to take part in year after year with little forethought or return on investment.

Exhibit sponsors frequently expect company involvement—as does the exhibit's host government. Despite the potential political pitfall, more companies are seeking ways to trim expenses, which results in closer scrutiny of trade show and exhibit participation.

The larger and more diverse companies have staffs dedicated solely to trade shows. Their responsibilities include establishing exhibition specific campaigns, regional and country themes, and product or program display priorities—all while integrating corporate branding initiatives. Smaller companies often do not enjoy the luxury of dedicated staffs, and the responsibility falls to business development or program management.

Although industry remains skeptical about trade show effectiveness, companies continue to participate. But regardless of a company's size or bottom line, here is where the individual program and/or business development managers find themselves when either supporting their companies' trade show displays or when merely attending as a spectator. It has been my experience that they often are ill prepared and frequently attend without a plan or an objective.

Benefiting the Most

A trade show is so much more than static displays and exhibit booths. It is a gathering of customers and a rallying point for senior government, military and industry officials (both U.S. and foreign), industry partners and suppliers, company foreign representatives and consultants, and even competitors. It would take the better part of a year. not to mention considerable expense. to travel and individually meet with the assembled personalities and organizations in their home countries.

To gain the full benefit from this collection of defense specialists and political, government and industry leadership, it is essential to arrive at the show with a comprehensive plan.

The first action should be reading the prior event's after-action report. Although many shows occur in alternating years and the information may be outdated, studying such reports can provide insight into customer attendance, daily customer activity and any administration foul-ups or quirks.

Planning: Like a military operation, the more thorough and comprehensive the planning the easier the execution and the more likely a successful outcome. Planning starts with reviewing company pursuits and campaigns along with customer contact plans to ensure the near-term program priorities are addressed during the show.

Next, identify potential customers (both U.S. and international) who are likely to attend and then task the company's in-country representatives and consultants to determine which key foreign government decision makers and program personnel will be there. Ask domestic company field offices to aid in the determination of U.S. Government participation and to coordinate any meetings.

Review strategic industry teaming and partnering initiatives that directly support a pursuit, customer base or product. Determine if meeting with key industry officials during the show or exhibit will support these initiatives.

Identify customers equipped with the company's defense item(s) and ensure familiarity with each customer's likes and dislikes. Always be prepared to discuss, and consider being proactive to counter any customer concern while reinforcing company support.

> ## To gain the full benefit from this collection of defense specialists and political, government and industry leadership, it is essential to arrive at the show with a comprehensive plan.

Committing to early planning, establishing objectives with measurable outcomes, timely meeting scheduling, continuous coordination eliminating schedule conflicts right up to and throughout the event, and executing each event day's activities in a disciplined manner will achieve the maximum utility from a trade show or exhibition. It is necessary for the managers who represent their companies to think of the event as a major business opportunity that demands detailed planning and disciplined execution.

Know and understand the company and program "hot button" issues that may impact customers even if the program is not a direct responsibility. Saying the wrong thing or responding inappropriately to an existing or potential customer may not only result in company embarrassment, but could have far reaching affects.

A trade show is an opportunity to meet with suppliers. Solicit company supply chain to determine if any programs have

Paris Air Show.
From Wikimedia Commons (the free media repository).

supplier issues or concerns that might impact an existing or potential customer. Also, consider collaborating with suppliers on product or system exhibit displays. If the company participating is a supplier, the exhibit is an excellent vehicle to meet with the prime(s) being supported and those identified as new opportunities.

Review the list of company in-country representatives and consultants who will attend the trade show and make sure that one-on-one meetings are scheduled. Require each to provide a comprehensive update on all country and/or customer activities involving ongoing pursuits, competition presence, existing customer concerns, potential customers' thinking and industrial teaming or partnering opportunities.

Plan for leadership involvement. A trade show is an excellent opportunity to introduce company leadership to industry counterparts, government and military leaders, customers and competitors along with the many diverse personalities who make the international and domestic defense business what it is. Company leadership presence sends a positive message to the government and defense industry communities (U.S. and foreign), while providing leaders an opportunity to forge critical business relationships.

Determine if any company or program newsworthy events can achieve leverage by timing the public release during the show, thereby gaining maximum exposure. Additionally, a trade show provides an opportunity to tell the company or program story through planned and spontaneous media interviews. Although an interview provides free publicity and should be considered a public affairs asset, caution should always be exercised when interacting with the media. Interviews must support the company's agenda and program objectives.

An important resource when planning is the U.S. Office of Defense Cooperation (ODC), part of the U.S. Ambassador's Country Team in the exhibit's host country. The ODC is a good source for determining U.S. Government participation and normally is charged with coordinating the trade show involvement of the Defense Department, Combatant Commanders, military Services and other government agencies and organizations. Additionally, the office frequently tracks both U.S. and foreign industry attendance.

Finally, intelligence is essential to any operation and there is no better source than a trade show or exhibition. Collecting critical information requirements (CIRs) is crucial for trade show attendees. Part of early planning is soliciting CIRs from the program, business development, supply chain and engineering staffs in order to develop a comprehensive collection plan. It is necessary to be armed with the right questions in order to remain focused on the CIRs. This collection effort is neither clandestine nor covert; it is information gleaned from conversations, product displays and meetings. Never forget that intelligence gathering is a two-way street, and the competition is seeking the same information about your systems.

Objectives: Every meeting must have an objective. Even social gatherings should have a desired outcome. A simple sentence or phrase noted in the margin of the meeting calendar helps to maintain focus. Strive to make objectives measurable so outcomes can be accurately assessed. An example might be when meeting with a potential customer: Validate system quantities, discriminating technical requirements and program timeline; solicit customer concerns; and reinforce company solution and willingness to respond to identified needs.

Scheduling Meetings: Once the manager completes his or her initial planning the next challenge is securing the meeting with the right people on a day and time agreeable to all concerned. This is a daily occurrence for an executive assistant but often becomes a labor-intensive exercise for the individual manager. Much of the coordination should fall to the company's

in-country representatives, consultants and forward-deployed personnel. In the case of a domestic trade show, company field offices should be assigned the responsibility of scheduling and coordinating U.S. Government participation.

Additionally, when dealing with a potential or existing international customer, industry must determine if a U.S. Government presence is needed. If it is needed, coordination must be accomplished early as government participation is normally in high demand. As the show calendar becomes populated, each meeting should have an agenda, list of participants and a desired outcome.

Conducting Meetings: A properly arranged event calendar should be filled with meetings from start to finish. Although it generally is accepted that trade show meetings span a broad range of information, are short on detail and often limited to high-level discussions, every meeting has the potential to delve deeply into specifics, necessitating thorough meeting preparation. It is critically important that each hosted meeting be driven by an agenda. Even if the agenda cannot be shared, the host still needs to guide the topic of conversation, while remembering that listening to the customer is paramount. It also is important for the manager to have a notional agenda in his or her back pocket for those impromptu meetings that happen with little or no notice.

Reports and After Action Reviews: Finally, in order to capture the labors of the show, it is important to document the significant activities along with any unanswered customer questions and stated or implied commitments. The information provided in an oral review or written report is perishable, so the content should be limited to those activities that impact the company's strategic and operational objectives, active pursuits, new business leads, customer concerns and competitors' presence. Critical information gathered needs to be disseminated promptly to those who generated the questions—including negative responses.

Conclusion

Defense trade shows provide rare opportunities for participants and attendees to meet, in a single location, government and industry professionals from around the world representing a variety of backgrounds and disciplines. Many such encounters result in lasting relationships, both personal and professional, and this key ingredient for any business arrangement should never be underestimated. Additionally, the exhibit provides an opportunity to cultivate existing relationships and rekindle those thought to be lost.

Much of what has been discussed may seem to be matters of common sense, but experience has proven otherwise. Senior management rarely demands accountability from its exhibit participants or attendees. Therefore, expectations are low for trade shows. Although exhibit participation can be controversial within industry, a little prior planning, disciplined execution and timely follow-up by business development and/or program managers who attend the shows can transform what could be three or four unproductive days into one of the year's biggest business opportunities.

Marine Gunnery Sgt. Joseph Perera of the Marine Warfighting Laboratory guides a robot in the Pentagon Courtyard during the DoD Lab Day.
DoD Photo by E. J. Hersom.

Complexity and rapid change characterize today's strategic environment, driven by globalization, the diffusion of technology, and demographic shifts.

—National Military Strategy of the United States, June 2015

Defense Labs

The Innovation Engine for Sustaining Our Quality Edge

Dale Ormond ■ Edie Williams, Ed.D.

The recently released National Military Strategy (NMS) characterizes the strategic environment as one in which globalized, diffused technology in the hands of not only nation-states, but also violent extremist organizations, is challenging the competitive advantage we have enjoyed for decades. The NMS calls for investment in future capabilities like space, cyber, integrated and resilient Intelligence, Surveillance, and Reconnaissance (ISR), precision

Ormond *is principal director for Research in the Office of the Assistant Secretary of Defense for Research and Engineering (ASD[R&E]).* **Williams** *is consultant to the ASD(R&E).*

> **With all this emphasis on the need for sustaining our quality edge by delivering next-generation programs, the next logical question is where to look in the Department of Defense (DoD) for the innovation and technical excellence we need.**

Commandant of the Marine Corps Gen. Joseph Dunford is briefed on the Army Concept for Advanced Military Explosion-Mitigating Land (CAMEL) demonstrator for vehicle occupant protection.
Photo by U.S. Army Research, Development and Engineering Command.

strike, missile defense, autonomous systems and other changes, to retain or increase our fighting edge.

The Long Range Research and Development Planning Program (LRRDPP) and, more broadly, the Defense Innovation Initiative (DII), aim to shape these investments by pursuing leap-ahead technologies that give us this advantage. The DII supports the first pillar of the Force of the Future, Competitiveness through Technological and Operational Superiority, promoted by Secretary of Defense Ashton Carter in his May 6 statement to the Senate Appropriations Defense subcommittee as the key to maintaining and extending "our technological edge over any potential adversary." Building the force of the future is the responsibility of the acquisition, technology, and logistics (AT&L) communities. The initiatives in Better Buying Power 3.0 (BBP 3.0) challenge AT&L's leaders to achieve dominant capabilities through technical excellence and innovation. In the Science and Technology (S&T) community, Reliance 21 is the overarching strategic framework for joint planning and coordination of 17 technology areas or Communities of Interest.

DoD Lab Day and Outreach
With all this emphasis on the need for sustaining our quality edge by delivering next-generation programs, the next logical question is where to look in the Department of Defense (DoD) for the innovation and technical excellence we need. One answer lies in a better understanding of the Defense Laboratory Enterprise and how fostering a closer relationship with the DoD acquisition community can speed the flow

of technology, by technology area, from our DoD Labs into acquisition programs. One example of this type of outreach was the inaugural Better Buying Power 3.0-inspired DoD Lab Day. At this event, the DoD Labs presented more than 100 exhibits in the Pentagon Center Courtyard.

"All these things ... allow our warfighters to have the cutting-edge capabilities they really need, and laboratory innovation is at the forefront of that," said Under Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall, the host of the May event, at which Deputy Secretary of Defense Robert Work also spoke and presented three military laboratories with a $45 million award to fund a special project in quantum information science.

There are dozens of DoD Labs and Engineering Centers across 22 states employing more than 38,000 scientists and engineers engaged not only in military-related innovation and technology but also in S&T we have shared to mitigate global disasters, support peacekeeping missions, and even make National Football League helmets more effective. From fighting the Ebola virus to protecting soldiers from traumatic brain injury, the urgency and responsiveness of our scientists and engineers makes them a tremendous resource to every acquisition professional—regardless of the area of concentration.

It's no wonder the first research and engineering task under BBP 3.0 calls for DoD leaders' improved ability to understand and mitigate technical risk by increasing the flow of information from the research and engineering community, often

Army

- Aviation and Missile Research, Development and Engineering Center (AMRDEC)
- Armament Research, Development and Engineering Center (ARDEC)
- Army Research Institute for the Behavioral and Social Sciences (ARI)
- Army Research Laboratory (ARL)
- Communications-Electronics Research, Development and Engineering Center (CERDEC)
- Edgewood Chemical Biological Center (ECBC)
- Engineer Research and Development Center (ERDC)
- Natick Soldier Research, Development and Engineering Center (NSRDEC)
- Space and Missile Defense Command -Technical Center (SMDC-TC)
- Tank Automotive Research, Development and Engineering Center (TARDEC)
- U.S. Army Aeromedical Research Laboratory (USAARL)
- U.S. Army Center for Environmental Health Research (USACEHR)
- U.S. Army Institute of Surgical Research (USAISR)
- U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)
- U.S. Army Research Institute of Environmental Medicine (USARIEM)
- Walter Reed Army Institute of Research (WRAIR)

Navy

- Naval Air Warfare Center Aircraft Division (NAWCAD)
- Naval Air Warfare Center Weapons Division (NAWCWD)
- Naval Medical Research Center (NMRC)
- Naval Research Laboratory (NRL)
- Naval Surface Warfare Center Carderock Division (NSWC Carderock)
- Naval Surface Warfare Center Corona Division (NSWC Corona)
- Naval Surface Warfare Center Crane Division (NSWC Crane)
- Naval Surface Warfare Center Dahlgren Division (NSWCDD)
- Naval Surface Warfare Center Indian Head Explosive Ordnance Disposal Technology Division (NSWC IHEODTD)
- Naval Surface Warfare Center Panama City Division (NSWC PCD)
- Naval Surface Warfare Center Port Hueneme Division (NSWC Port Hueneme Division)
- Naval Undersea Warfare Center Newport Division (NUWC NPT)
- Space and Naval Warfare Systems Command Systems Center Atlantic (SSC Atlantic)
- Space and Naval Warfare Systems Command Systems Center Pacific (SSC Pacific)

Marine Corps

- Marine Corps Warfighting Lab (MCWL)

Air Force

- Air Force Research Laboratory (AFRL)

Laboratory activities also occur at other sites across the United States, with additional activities internationally. For more information, visit **www.acq.osd.mil/rd/ laboratories** or download the Defense Laboratories eSmartBook App at http://ow.ly/PIALM.
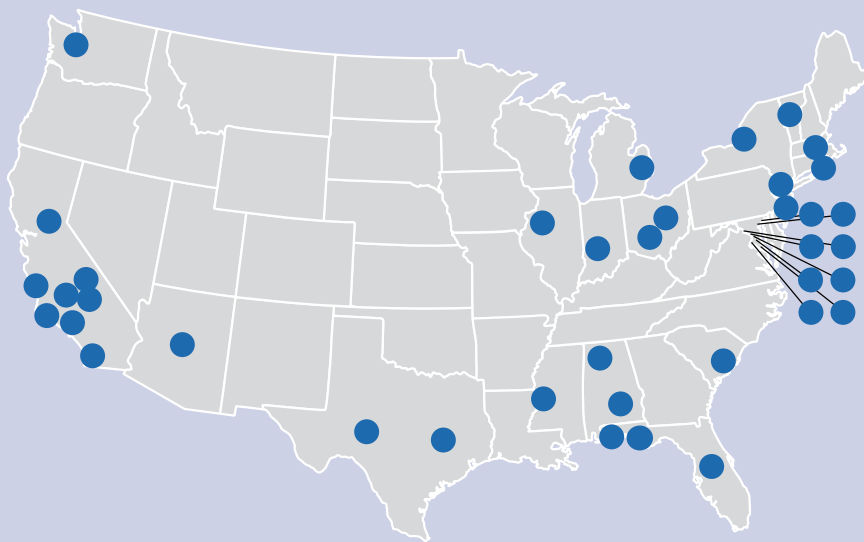
referred to as the S&T community, to the acquisition community. Insiders have long debated the "valley of death" that contains untold numbers of technology programs that were conducted with S&T funding but, for whatever reason, could not find homes in acquisition programs. The reasons have been studied extensively, but one finding surfaces repeatedly: The S&T community can and should increase its outreach to the acquisition community. DoD Lab Day was one of the ways we have begun our outreach, but there are many more ways our Labs and warfare centers are engaged with industry and academia, both at home and abroad. Our engagement includes collaborative work with industry, direct funding to university research centers, and/or co-use of development and testing facilities with other government agencies. We are searching for and bringing in the best ideas from these partnerships with academia and industry to solve our capability gaps and military challenges in all areas, through basic research to advanced system development.

The second task we have been given under BBP 3.0 is to improve the return on investment in our DoD laboratories. The DoD's in-house laboratories and warfare centers execute about $30 billion in both direct funding and work for others per year. This initiative will examine the mission, organization, test strategies, cost structure and productivity of the DoD laboratories with the goal of increasing the return

41

Air Force 2nd Lt. Anthony Eastin describes the Battlefield Air Targeting Man-Aided Knowledge (BATMAN) system.
U.S. Air Force Photo by Tech. Sgt. Dan DeCook.

DoD laboratories are places where world-class scientists and engineers are engaged in meaningful work that supports not only the greatest military force on Earth but also making a positive global impact.

on this significant investment. We are engaging in a yearlong effort to more clearly define metrics, review organizational and funding constructs, and survey customers to ensure that they are getting the best products with the best overall value to the warfighter.

The third task is to increase DoD support for Science, Technology, Engineering and Mathematics (STEM) education and outreach. We are committed to informing DoD leaders, educators, parents and students that DoD laboratories are places where world-class scientists and engineers are engaged in meaningful work that supports not only the greatest military force on Earth but also making a positive global impact now and in the future. Some examples of our best and brightest were our recent Scientists of the Quarter who were honored during the Opening Ceremony of DoD Lab Day. They included:

- Dr. Jeff Long, Naval Research Laboratory, for his work with electrochemical capacitors and validation of advanced nanostructured materials that enhance the performance of military-critical technologies, ranging from electrochemical power sources to separation/filtration to magnetics.
- Dr. Rasha Hammamieh, U.S. Army Center for Environmental Health, for her work in the Post-Traumatic Stress Disorder (PTSD) Systems Biology Exemplar Program that established the basis for an objective molecular panel for PTSD that helps us understand more fully and treat our seriously ill soldiers, sailors, airman, Marines and veterans.
- Dr. Olukayode K. Okusaga, Sensors and Electronic Devices Directorate, U.S. Army Research, Development, and

Engineering Command, Army Research Laboratory, for his work on the development of novel fiber optic communications links that provide alternatives to the Global Positioning System (GPS).
- Daniel A. Uppenkamp, Layered Sensing Exploitation Division, Sensors Directorate, Air Force Research Laboratory, for his work in data analytics and cloud computing.
- Dr. Susan Berggren, Space and Naval Warfare Systems Center Pacific, for her work on Superconducting Quantum Interference Device (SQUID) array modeling and design that will dramatically increase the listening capabilities in the 1 megahertz (MHz) to 10 gigahertz (GHz) range and reduce the physical size of antennas, thereby facilitating their use on Unmanned Aerial Vehicles (UAVs) and streamlining the topside characteristics of Navy ships.

Our ability to maintain and improve the U.S. technological edge also depends, in large part, on the up and coming DoD S&T workforce. Most high school and college STEM students are unaware of the Defense Labs or the opportunities they provide to become part of the next global game-changing technology. DoD Lab Day was a chance for many high school students to experience up close these lab innovations and meet their innovators.

"When researchers are relatable as human beings, students can really see themselves in those same roles, and it pushes them to pursue STEM fields," says Faith Darling, the STEM Coordinator at the Bullis School in Potomac, Maryland, whose students attended the Pentagon event. According to Dr. Daniel Stabile of Bishop O'Connell High School, Arlington, Virginia, four of that school's students plan to pursue DoD

42

Elizabeth Seton High School students from Bladensburg, Maryland, discuss an exhibit at the DoD Lab Day with an engineer from the Army's Construction Engineering Research Laboratory.
Photo by U.S. Army Research, Development and Engineering Command.

Most high school and college STEM students are unaware of the Defense Labs or the opportunities they provide to become part of the next global game-changing technology.

engineering careers as a result of their experience at DoD Lab Day.

DoD Lab Contributions

Even when people are aware of DoD S&T success, they don't often attribute it to the laboratories. "Defense laboratory R&D activities enabled DoD to cut in half the fatality rate of wounded soldiers between Vietnam and recent conflicts in Iraq and Afghanistan. The changes in clinical practice that facilitated this decrease have been transferred for use in civilian trauma centers today," says George Ludwig, Deputy Principal Assistant for Research and Technology, U.S. Army Medical Command, Reserve Medical Corps, and Acting Director of the Defense Laboratories Office. Continued such efforts will help ensure that acquisition professionals find value when they turn to the labs for assistance in building and developing their programs.

The Defense Laboratory Enterprise is grounded in DoD's strategic imperatives. In fact, more than half of the items exhibited at the DoD Lab Day event either already are fielded or expected to be fielded within a year. Through these efforts, we are striving to be the innovation engine that will allow our military to overcome current and future challenges to our security, especially trans-regional networks of sub-state groups like the insurgent ISIL or ISIS ("Islamic State of Iraq and the Levant") that threaten our national interests. Tom Dee, Deputy Assistant Secretary of the Navy for Expeditionary Programs and Logistics Management noted that, "The displays at Lab Day, and the interaction with the Lab personnel, made me wiser about the importance of open architecture and module capability

insertions as we endeavor to expand the opportunities that unmanned systems offer to our future capabilities."

Marine Corps Brig. Gen. Frank Kelley, Acting Deputy Assistant Secretary of the Navy, Unmanned Systems, said he was "blown away" by the CICADA (Close-In Covert Autonomous Disposable Aircraft), a palm-sized air vehicle he had never seen before Lab Day. As a result of his interactions during DoD Lab Day, he arranged to spend an entire day at the Naval Research Laboratory and discussed "what ifs" about demonstration and experimentation. As a result, he is analyzing further how the Navy might integrate these capabilities into Marine and Naval operations and systems. He also was introduced to many other technologies that left him with confidence that the DoD Labs "can be your technological conscience as a program manager, to help you make good decisions."

With the next DoD Lab Day scheduled for 2017, we are focused on using the experience from DoD Lab Day 2015 to improve communications with the acquisition community with the goal of bringing innovation forward sooner. The DoD needs private sector contributions to be sure, but the value of working with DoD Labs is that they understand DoD requirements and the needs of the military. "My message to the acquisition community is to team with the labs," says Kelley. "The labs need to be an integral part of your program—your first stop—when you have a technological challenge."

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SURVEY

THE DAVID PACKARD
Excellence in Acquisition Award

THE DAVID PACKARD EXCELLENCE IN ACQUISITION AWARD was established to recognize organizations, groups and teams that have demonstrated exemplary innovation using best acquisition practices that achieve acquisition excellence in the Department of Defense (DoD). It is the DoD's highest acquisition team award and was first awarded in 1997 in honor of David Packard, a Deputy Secretary of Defense in the Nixon administration. Mr. Packard also was the co-founder and chairman of Hewlett-Packard Co. and chairman of the President's Blue Ribbon Commission on Defense Management chartered by President Ronald Reagan in 1985. Packard founded the Defense Systems Management College in 1971 and was a strong advocate of defense acquisition excellence. The Packard Award is sponsored by the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]).

Inaugurating the Should Cost and Innovation Award

This year's 2014 Should Cost and Innovation Award is the first such award. The Should Cost and Innovation Award recognizes organizations, groups or teams that have displayed outstanding commitment, innovation and results from using Should Cost management. The Should Cost concept is fundamental to proactive cost control throughout the acquisition life cycle. This initiative requires actively managing cost, starting with a deep understanding of cost structures, followed by identifying specific goals for cost reduction (Should Cost goals) and efforts to achieve those cost reductions. Should Cost is a core and enduring Better Buying Power initiative, and most programs and contracted activities in DoD now have Should Cost targets and are managing to them.

2014 David Packard Award Winner

The Advanced Extremely High Frequency Program Team

The Advanced Extremely High Frequency (AEHF) program team was presented the David Packard Excellence in Acquisition Award for its innovation in providing survivable, secure, protected and jam-resistant satellite communications for high-priority users, including the president of the United States, strategic and tactical warfighters, and AEHF's international partners—Canada, the Netherlands and the United Kingdom. AEHF is operated by the U.S. Air Force Space Command.

The AEHF team utilized a revolutionary Block Buy space acquisition strategy to procure the fifth and sixth AEHF satellites (AEHF-5/6), saving $1.6 billion, while operationally accepting the Increment 5 mission control segment and launching, checking out and transferring to operations the third AEHF satellite (AEHF-3). The team also developed a consolidated three constellation sustainment approach that will save $300 million, while beginning Multi-Service Operational Test and Evaluation's integrated testing, which cut the required time for operational test by 49 percent. This translates to a projected Initial Operational Capability declaration at the program's 2015 acquisition baseline objective date, saving $27 million.

As a result of the 5/6 Block Buy savings, the Military Satellite Communications Space Modernization Initiative was established and represents the investment plan to sustain and enhance current program-of-record systems while progressing to more affordable and resilient future systems. This has helped ensure that the United States continues to have the world's most advanced satellite communications capabilities.

← Under Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall, Assistant Secretary of the Air Force (Acquisition) Dr. William A. LaPlante, with AEHF Program Manager Col Stephen Purdy.

↓ From left to right: Secretary of Defense Ashton Carter, Col Stephen Purdy, Col (Ret.) Rodney Miller, William Althoff, Maj Darrell Grob, Maj Alicia Abrams, Col (Select) Shawn McCamish and Mr. Kendall.

Photos by U.S. Navy Petty Office (MC2) Sean Hurt.

2014 David Packard Award Winner

The Intercontinental Ballistic Missile Systems Directorate

The Intercontinental Ballistic Missile (ICBM) Systems Directorate, under the Air Force Nuclear Weapons Center, was presented the David Packard Excellence in Acquisition Award for targeting affordability and controlling cost growth while performing true cradle-to-grave life-cycle management for the Minuteman III ICBM System and delivering on the Chief of Staff of the Air Force's top priority of strengthening the Nuclear Enterprise.

The team developed a novel acquisition strategy that inserted inter-Service technology and components to modernize and replace the entire fleet of nuclear arming and fuzing capabilities. This strategy promoted industry innovation, as well as joint and international cost and technology sharing, and reduced the overall burden of strategic investment for a broad base of interested stakeholders.

The team also reduced the future Minuteman III fuze from two aging configurations to a single modern configuration. This single biggest modification to the weapon system in 20 years of developed business case analyses included interagency Department of Energy warhead stockpile reduction and teaming initiatives with international strategic weapons partners. It has saved $3.2 billion since 2010 and represents a 2015-2019 future savings of $478 million more while refreshing technologies and leveraging pre-existing nonrecurring engineering work.

The directorate's efforts will keep 450 Minuteman III ICBMs, 45 launch control centers, dozens of maintenance vehicles, multiple communication systems, and 34,600 square miles of infrastructure operational while delivering the highest sustained alert rate in the weapon system's 50-year history.

Mr. Kendall and Dr. LaPlante, with Col Ryan Britton, Director of the ICBM Systems Directorate. ➔

⬇ **From left to right: Col George Farfour (Air Force Nuclear Weapons Center Deputy Commander), Col Scott Jones (ICBM Ground Systems Senior Materiel Leader), Mr. Carter, Col Ryan Britton (ICBM Systems Directorate Director), Mr. Kendall, John Carlson (ICBM Systems Directorate Program Control Chief), Kayla Marshall (ICBM Systems Directorate Deputy Director).**

2014 David Packard Award Winner

The VIRGINIA Class Submarine Program Team

The VIRGINIA Class Submarine (VCS) Program Team was presented the David Packard Excellence in Acquisition Award for significant savings from shipbuilder proposed pricing and more than $1 billion from adjusted current submarine production performance when it awarded a fixed-price incentive (firm target) multiyear contract for more than $17 billion.

The VCS Block IV contract inherently increased shipbuilding industrial base stability and decreased construction costs through economic ordering of material and increased throughput in the building yards. The Request for Proposal reflected innovative initiatives to promote competitive strategies unique in the sole-source environment for procuring submarines. The VCS Block IV multiyear contract reflects cost saving and risk reduction initiatives developed in the solicitation and maintained through the proposal analysis, culminating in the most successful negotiation and award of any fair and reasonable shipbuilding contract in the last 20 years.

The VCS Block IV team made exemplary achievements in efficiency and productivity in defense spending through: detailed labor hour analysis using should-cost strategies; deep diving into the cost proposals of more than 200 major multitiered subcontracts; driving changes in shipbuilder purchasing processes by negotiating at the subcontractor level; independently evaluating every aspect of the prime shipbuilder's (and major subcontractor's) labor rates; pressing firmly on the shipbuilders to negotiate from fact-supported data; and effectively integrating the chain of command into negotiations when necessary to maintain a single U.S. Navy "voice."

These efforts will ensure delivery of 10 submarines at the rate of two per year from Fiscal Years 2014 through 2018. This is the largest number of submarines under a single contract in the last 40 years.

← Mr. Kendall; Lisa Bonacic, Deputy VCS Program Manager; Principal Deputy Assistant Secretary of the Navy for Research, Development and Acquisition James E. Thomsen; and Gloria L. Valdez, Executive Director of the Submarine Program Executive Office.

↓ From left to right: Danielle Barton, Maura Styczynski, Sara Ainey, KC Laskey, Scott Anderson, Mr. Carter, Mr. Kendall, Lisa Bonacic, John Lucio, Ms. Valdez, Erin Anderson.

2014 Should Cost and Innovation Award Winner

The Maritime Patrol and Reconnaissance Aircraft Program Office

The Maritime Patrol and Reconnaissance Aircraft Program Office and its P-8A Poseidon Integrated Product Team were presented the USD(AT&L) 2014 Should Cost and Innovation Award for exemplary execution of Should Cost management and proactive cost control. The team integrated Should Cost into all core technical and management processes, yielding savings across all phases of acquisition. As of June 2014, the team identified total savings of more than $5.2 billion, nearly all of it captured in the President's Budget for Fiscal Year 2015. Though the program delivery is early, $1.4 billion of the savings is in aircraft procurement. This resulted from increases in production efficiency, procuring subsystems and supply as

Government Furnished Equipment, and innovative contract financing strategies. The P-8A team's focus on reducing operational support costs saved $3.8 billion in Operations and Support (O&S). The O&S savings primarily were due to a strategy change from full contractor logistics support to an innovative product support strategy that leverages organic support, public/private partnership depots, competitive support for commercial engines and airframes, and an intermediate level maintenance capability for high cost drivers. Through its efforts, the P-8A team provided an outstanding example of repeatable Should Cost processes while delivering real savings and cost-effective capabilities to deployed warfighters.

Mr. Kendall, Mr. Thomsen and CAPT Scott Dillon, Program Management Air (PMA)-290 Program Manager. ➔

⬇ **From left to right: Sarah Prelog, Martin Ahmad, Mr. Carter, CAPT Scott Dillon, Mr. Kendall, Kathleen Stull, Robert Holmes.**

Briefing Executives

Roy Wood, Ph.D.

S o, you are on the calendar to brief a general or flag officer or senior executive. You are understandably anxious—there's a lot at stake. You need approval of your plan in order to move forward. You have to report some bad news. Or maybe it is just an information brief to someone with a reputation for asking hard questions.

First, congratulations. You made it on the executive's calendar—no small feat. You have been given 45 minutes of this individual's very valuable time, and you know you need to make the most of it. So now what? How can you best prepare?

Wood *is the Acting Vice President of the Defense Acquisition University and former Principal Assistant Deputy Under Secretary of Defense. He is a retired naval officer and acquisition professional.*
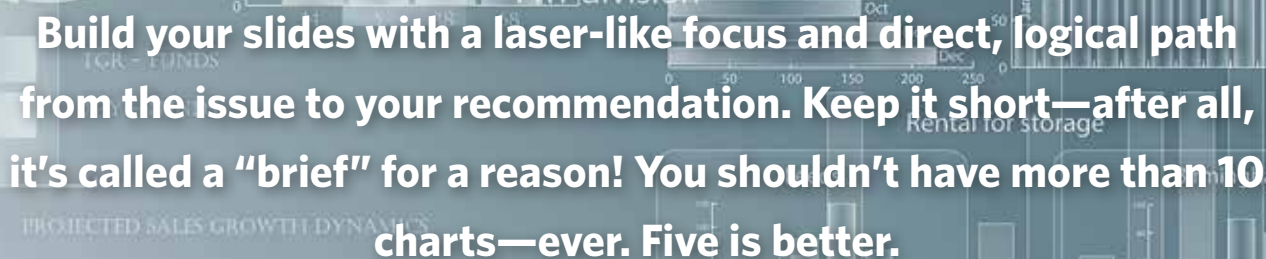
Plan the Content

What is the purpose and intended outcome of the meeting? Is your briefing only for information, or are you making a request or expecting a decision? Are you bringing a good news story, or hand-delivering a catastrophe? Do you have a good plan for the way ahead, or are you reaching out for help? Did you ask for the meeting, was it requested by the executive or was it thrust upon you by some intermediary? All these factors, and more, will influence the content and presentation. Let's look at some of them in more detail.

Information Only: If the sole reason for the meeting is to provide information, consider whether a meeting actually is necessary. Would the general prefer a short point paper or

Good News vs. Bad News: Obviously, the tone of the meeting will be different depending on the type of news you are trying to convey. Good news is easier to convey than bad news, and you must be better prepared to explain what happened and how you will turn the bad news into better news before the next meeting. Explaining bad news usually requires a chronology of events that led up to the catastrophe, the damage-control measures you put in place, what you have learned from the experience, and your plan or recommendation for picking up the remaining pieces and moving forward.

General Rules for Content: Whatever the purpose or occasion for a briefing, here are some general considerations for its content:

> Build your slides with a laser-like focus and direct, logical path from the issue to your recommendation. Keep it short—after all, it's called a "brief" for a reason! You shouldn't have more than 10 charts—ever. Five is better.

an annotated slide deck to review at his leisure? Ask the executive or military assistant whether this would suffice. They may jump at the chance to fill your time slot with something more urgent and drop your paper or brief into the general's weekend read package. If the general wants a follow-up meeting after reading your package, he will be more prepared and likely will have more insightful questions for you to focus your efforts.

Meetings for Decisions or Help: If you need a decision or executive-level help, make that clear up front to help the leader focus on evaluating the options you provide, asking key questions, and being prepared to make the call at the end. Be sure you discuss the major alternatives you have considered, including the pros and cons of each. Summarize any supporting technical and programmatic data, differences between the options, and your recommended course of action. You want the executive to know you've done your homework. Don't be surprised or hurt, however, if the executive doesn't accept your recommendation at face value. He or she will undoubtedly have many questions for you to answer and clarify, and, in the end, the executive may decide on a different alternative, a combination of alternatives or an entirely new one you had not considered. You may even be asked to go away and do some additional work. That's OK. Your efforts should result in a decision the leader is comfortable with. Otherwise, why you would you ask him or her for a decision in the first place?

- Make sure the briefing is logical and flows well. Unless otherwise specified by the executive, organizing your brief in a point paper fashion often is best—issue, background, discussion, recommendation.
- Ask colleagues to red-team your content to find flaws in your logic and to help formulate likely questions.
- Never put anything on a chart you cannot fully explain.
- Consider creating a BLUF (bottom-line up front) chart to lead off the briefing. Here you can describe the purpose, key points of your brief, and summarize your recommendation. This preview helps the executive quickly understand the overall context before being deluged with the details.

Consider the Format

First, do you need slides? If they are needed, make sure the slides facilitate and complement the discussion. Don't make your slides with lots of transitions and animations—cute slides are distracting. You want the executive to concentrate on what you are saying and not be mesmerized by your visuals.

Build your slides with a laser-like focus and direct, logical path from the issue to your recommendation. Keep it short—after all, it's called a "brief" for a reason! You shouldn't have more than 10 charts—ever. Five is better. Backup charts are OK, but only the essential ones. Know exactly which one to pull up to answer any question with no aimless flipping through your stack.

Storyboard your slides and audio to ensure you convey the content in a logical and understandable manner. Have staff or colleagues critique the presentation ahead of time to find any flaws and to prompt you with any likely questions or concerns that may come up at the real meeting. Then practice, practice, practice.

Use pictures or graphs where possible to clarify and simplify. Show a funding vs. time chart to illustrate the dip where additional cash is needed. This is much more understandable than a spreadsheet table. When words are needed, use short bullet phrases to highlight your points. Never read your chart to the executive—he or she can read. If you worry that bullets may not convey the full meaning, consider elaborating in speaker's notes or create an accompanying point paper to leave behind.

If the executive's staff has specified a standard briefing format or template, stick to that and don't deviate. Executives often use standard formats enable them to quickly pick out information they need, knowing exactly on which slide it will be located. It's simpler to find, digest, understand and compare information in a standard format. If you need to convey information that doesn't fit well with the template, do so in the discussion and, if necessary, bring a backup slide.

Consider Your Delivery

Plan that half your time will be devoted to the briefing and half to discussion and questions. But never be a slave to this formula. If the leader has previewed the read-ahead, you may spend all the time discussing and answering questions. Some leaders will interrupt constantly to ask questions or discuss each point. Go with the flow. Read the body language and provide the executive with information in whatever delivery method makes sense to the executive. Hint: You can often get tips about the executive from his or her assistants. Call the assistant and see if you can get any insights regarding the executive's preferred briefing styles and whether there are any personal quirks or hot buttons to avoid.

In delivering your briefing, always be open, transparent and truthful in your discussions and answers to questions. Be confident and realize that you are probably the most knowledgeable person in the room about the particular topic under discussion. Recognize that executives have their own filters and biases and may not see things the same way you do, so don't hesitate to gently and tactfully clarify any misunderstandings. Your overarching goal is for the leader to leave the room with a full understanding of the important issues and having made a good decision based on facts and inputs, tempered by his own best judgment. Be aware, however, that the executives might have information you are not privy to that will factor into their decision making. Respect that, but don't be afraid to respectfully ask for help understanding their rationale and insights—most leaders will discuss that, if asked.

As an example, some years ago, Navy RADM Wayne Meyer, the "Father of Aegis," was asked to lead a team to assess the readiness of an experimental high-energy laser to conduct tests against simulated cruise missile targets. Throughout the early part of the meeting, he continued to express skepticism that the system could track the target at low altitude. He was seeing the tests through his considerable experience with radars and needed to be convinced that our infrared tracker would work just fine. After a lengthy technical explanation and many questions, he acknowledged the misunderstanding, and we were able to move on. Getting up the nerve to push back wasn't easy—Meyer had a reputation for gruffness and great technical astuteness. In the end, I think he appreciated the discussion. On the other hand, there were many times during the readiness review when he offered insightful observations based on his many years of solving difficult technical problems. When he spoke, we always listened.

Always Have a Contingency Plan!

You've made the preparations, you have the briefing slides, your audio track is well rehearsed, and it is Show Time. As you arrive in the executive's office suite, the assistant notes that the executive is "running a little behind." The current meeting eats up 15 minutes of your briefing, and the assistant notes that the executive has a hard stop in 30 minutes. What do you do?

This is not unusual, so you need a contingency plan. Since it is unlikely you can get through your entire slide deck and audio track, you need to have chart-level takeaways and key points so you can quickly explain each chart without going through every bullet point in detail, answer any questions and move on. Remember, the discussion is what matters, so leave time for that no matter how short the meeting.

If your meeting gets cut even shorter, having a BLUF chart, explained earlier, may be your lifesaver. Use the chart to brief the key ideas and generate discussion. You may be able to make your points and get a decision in 10 or 15 minutes this way.

Finally, if your time slot is completely clobbered, you may be able to buttonhole the executive as he walks down the E-ring to the next meeting and give your two-minute "elevator speech" that summarizes the issues. You may not get a decision, but you can convey the importance of getting back on the calendar and teeing up some of the key information for the executive to consider in the meantime.

Summary

General officers and senior executives are busy people with much on their minds. They receive hundreds of briefings every month and often make dozens of key decisions every day. Being prepared, getting quickly to the point and offering a thoughtful recommendation will help your busy executive make the best possible decision in the limited time available.

Preserving the Dinosaurs

or At Least Their Knowledge!

Steven Jones

Illustration by Jim Elmore

When I was studying Chemical Engineering at the University of Pennsylvania, I struggled with all the homework and lab work; not with the technical challenge but with the amount of time required to actually do the labor-intensive table look-ups for each trigonometric function used. And, it was taking away from my practice time on the soccer field. Penn's freshman soccer team was one of the best in the country, requiring extensive practice to stay on the team. So what did I do? I switched to the Wharton School of Business, which had a less time-consuming curriculum.

Seven years later, as a lieutenant junior grade in the Navy, I was at the Naval Post Graduate School (NPGS) working on a technical master's degree. I got that technical master's degree in 30 months—with a very high grade
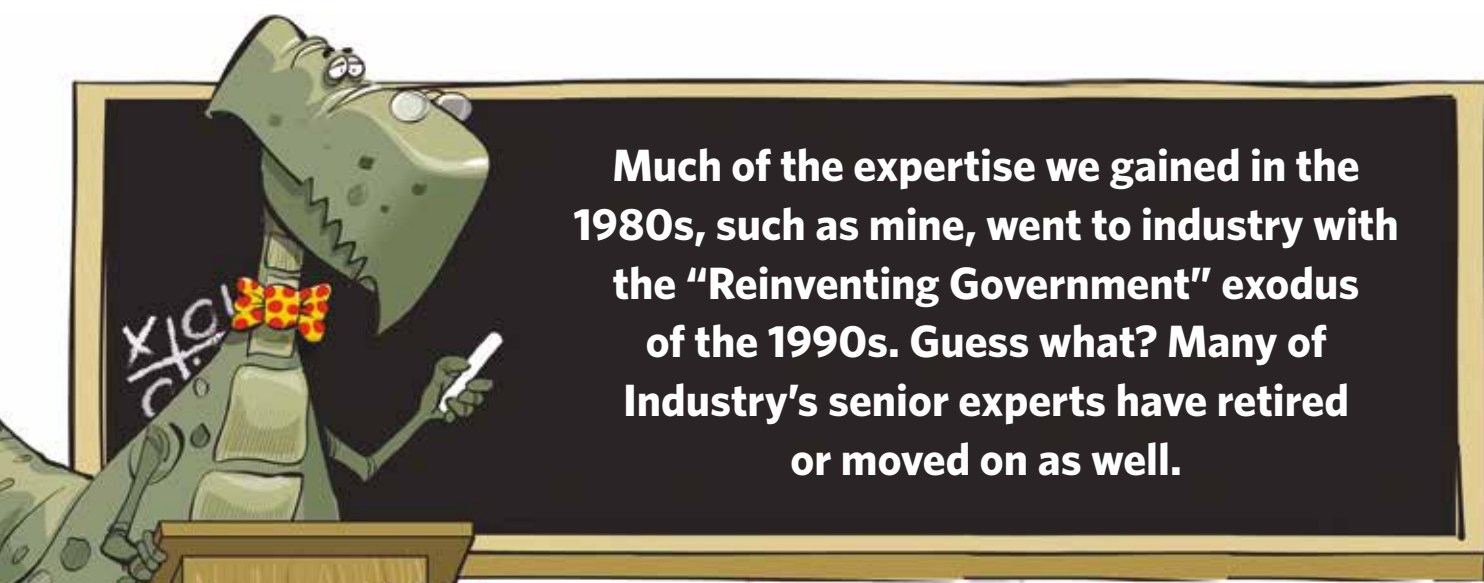
Jones is a professor at the Defense Systems Management College, where he specializes in engineering and principally provides consulting support through Mission Assistance in Department of Defense program offices.

point average, I might add. How was that possible? Technology brought us the scientific calculator that streamlined the labor-intensive mathematical calculations, thus enabling real learning. Additionally, NPGS had a very low student-to-faculty ratio. One of my math classes had five students studying under a Ph.D. professor. This was a much different learning environment than having 200 students, like some of my chemistry classes at Penn. At NPGS, a professor could stop his lecture and make sure important concepts were understood. You never got stuck. If you never get stuck, you never get frustrated. Wow, what a positive learning environment.

After graduation from the NPGS, I became a naval Engineering Duty (ED) Officer. Then-CAPT George Meinig, the technical director of the AEGIS Program, was assigned to be my qualifying officer. The ED community's approach to qualifying technical leaders was very much like what we hear about today in Coaching and Mentoring. However, this ED mentoring process goes well beyond what we typically read about in the literature. Meinig's approach to mentoring (like that of most ED Qualifying Officers) pushed the mentee (me in this case) by ensuring challenging technical experiences were part of my qualification plan. These experiences provided me with an opportunity to develop critical skills and acquire requisite domain knowledge. Meinig also wanted to make sure that qualified expertise was right there to help solve technical problems correctly. At a very junior level, I was leading a team tasked to solve program-stopping problems right alongside these technical experts. What a way to learn! In the midst of the Reagan build-up to the 600-ship Navy, I gained extensive and relevant "hands-on" experience that would serve me throughout my career.

Fast forward 30 years, after a fulfilling Naval career, 12 years at the Raytheon Company, and four years at DAU, I now look to see what process is in place to pass on my experiences to the next generation of technical leaders beyond the class-room. I recently taught a class at the Defense Acquisition University about technology transition. One of my students (a 20-something engineer) asked, "How do we get to gain the experience of the dinosaurs before they retire?" I thought that was a compliment because she was certainly not referring to me. DAU Mission Assistance (consulting) is available to help practitioners like this student was inquiring about. But that process has limitations. Could more domain specific tailored team training blended into the work place help in this knowledge/experience transfer?

The Department of Defense (DoD)-sponsored Systems Engineering Research Center (SERC) recently completed a study of our junior technical leaders' expectations (SERC-2013 TR-038-2, conducted under Research Topics 45 and 106). These junior engineers expect to move up into senior levels of management in the next five years. They don't have the patience to wait 20 years or so to get myriad experiences in complex engineering that their predecessors had gained before they were promoted.

Little did I realize that my 20-something student spoke for a large portion of our workforce. She had a very good point. DoD has always had a bathtub-shaped age demographic: lots of Dinosaurs and lots of Young Millennials. The differences between 30 years ago and today include the fact that we do not have a lot of new programs like we did in the 1980s for journeymen to gain experiences (not just time in a billet experience but lots of character-building experiences). Another difference is that much of the expertise we gained in the 1980s, such as mine, left government service and went to industry during the "Reinventing Government" exodus of the 1990s. Guess what? Many of Industry's senior experts have retired or moved on as well.

There is hope. On Nov. 15, 2014, Former Secretary of Defense Chuck Hagel signed out a Defense Innovation

> **Much of the expertise we gained in the 1980s, such as mine, went to industry with the "Reinventing Government" exodus of the 1990s. Guess what? Many of Industry's senior experts have retired or moved on as well.**

Initiative memo that stated: "We must accelerate innovation throughout the Department. ...The 21st century requires us to integrate leadership development practices with emerging opportunities to rethink how we develop managers and leaders." DAU is piloting just such a Development Program for Key Leaders in the Missile Defense Agency (MDA) over the next 12 months.

Key Components of this Leadership Development program are Active Learning, Mentoring and Coaching. Dinosaurs like me will provide experiences in the form of real-world case studies. These case studies will provide the student with challenging DoD acquisition dilemmas. DAU "Dinosaurs" and MDA subject-matter experts will mentor these future Key Leaders as they exercise multiple competencies such as:

- Critical Thinking
- Effective Communications
- Structured Decision Making
- Leading Change

One component of this classroom mentoring will add the dimension of decisiveness. Given these additional experiences while applying best practices and lessons learned, leaders can act more decisively with justifiable confidence in the future. This pilot also will employ a team-coaching concept in the workplace. DAU plans to coach 24 students in their work environments, applying this newly gained experience to their programs. DAU is pushing the envelope of case-based experiences in this pilot. This pilot like the calculator in my classes at the NPGS opens the door to a faster transfer of experiences than can be realized by only on-the-job-training.

Finally, the students then will be responsible for applying that best practice and/or lesson learned (rules of thumb) into their current acquisition environments. These students will brief their leadership on the successes and challenges of these team projects—adding to the Library of Best Practices and Lessons Learned. Without some structured program to document the knowledge of our current "Dinosaurs," thousands of lessons learned, best practices and engineering rules of thumb are about to be lost forever.

A deliberate DoD Innovation Initiative to "Save the Dinosaur" is needed before DoD is forced to practice archeology. This article is an invitation to others in DoD to document lessons learned and best practices across the enterprise. There also is an urgent need to mentor these best practices and lessons learned to enable more rapid development of our future leaders. The complexity of our new systems today demand it.

We may not be able to save the Dinosaurs, but maybe we can preserve their "Rules of Thumb." &

The author can be contacted at **steven.jones@dau.mil**.

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Defense AT&L

Writers' Guidelines in Brief

Purpose

Defense AT&L is a bimonthly magazine published by DAU Press, Defense Acquisition University, for senior military personnel, civilians, defense contractors, and defense industry professionals in program management and the acquisition, technology, and logistics workforce.

Submission Procedures

Submit articles by email to datl@dau.mil. Submissions must include each author's name, mailing address, office phone number, email address, and brief biographical statement. Each must also be accompanied by a copyright release.

Receipt of your submission will be acknowledged in 5 working days. You will be notified of our publication decision in 2 to 3 weeks. All decisions are final.

Deadlines

Note: If the magazine fills up before the author deadline, submissions are considered for the following issue.

Issue	Author Deadline
January–February	1 October
March–April	1 December
May–June	1 February
July–August	1 April
September–October	1 June
November–December	1 August

Audience

Defense AT&L readers are mainly acquisition professionals serving in career positions covered by the Defense Acquisition Workforce Improvement Act (DAWIA) or industry equivalent.

Style

Defense AT&L prints feature stories focusing on real people and events. The magazine seeks articles that reflect author experiences in and thoughts about acquisition rather than pages of researched information. Articles should discuss the individual's experience with problems and solutions in acquisition, contracting, logistics, or program management, or with emerging trends.

The magazine does not print academic papers; fact sheets; technical papers; white papers; or articles with footnotes, endnotes, or references. Manuscripts meeting any of those criteria are more suitable for DAU's journal, *Defense Acquisition Research Journal (ARJ)*.

Defense AT&L does not reprint from other publications. Please do not submit manuscripts that have appeared elsewhere. *Defense AT&L* does not publish endorsements of products for sale.

Length

Articles should be 1,500–2,500 words.

Format

Send submissions via email as Microsoft Word attachments.

Graphics

Do not embed photographs or charts in the manuscript. Digital files of photos or graphics should be sent as email attachments. **Each figure or chart must be saved as a separate file in the original software format in which it was created.**

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